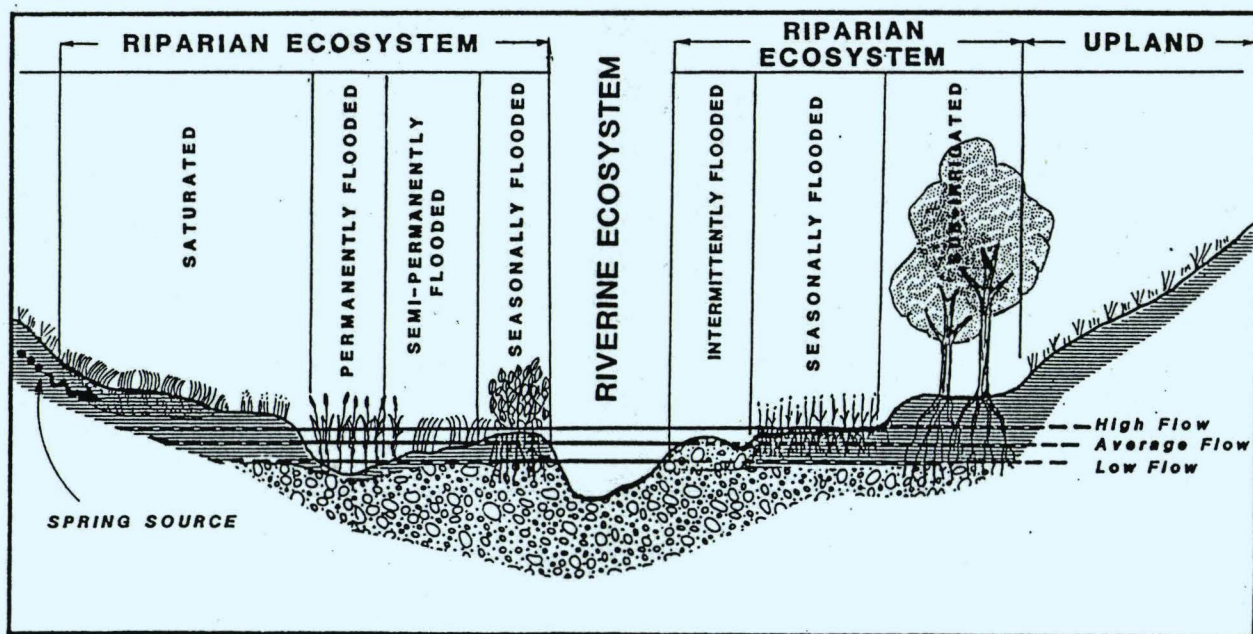




**Preliminary Classification
and Inventory of Riverine
Riparian Habitats
Livestock/Fishery Study Areas
Nevada**

Progress Report I

**William Platts
Sherman Jensen
Frank Smith**

PRELIMINARY CLASSIFICATION AND INVENTORY
OF
RIVERINE RIPARIAN HABITATS
LIVESTOCK/FISHERY STUDY AREAS
NEVADA

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LIST OF ACRONYMS

ARTR/POPR - Artemisia tridentata/Poa pratensis
ARTR-UP - Artemisia tridentata-upland
AMEL-UP - Amelanchier-upland
CANE - Carex nebrascensis
CAVE - Carex vesicaria
CB - cobble bar
CIR - color infrared
DC - Deer Creek
EB - eroded bank
GB - gravel bar
GC - Gance Creek
HCB - herbaceous cobble bar
HGB - herbaceous gravel bar
HSB - herbaceous sand bar
HSIB - herbaceous silt bar
JUBA - Juncus balticus
LFSA - livestock/fishery study area
MIGU - Mimulus guttatus
NFC - North Fork Cottonwood Creek
POPR - Poa pratensis
POTR/ARTR - Populus tremuloides/Artemisia tridentata
POTR/MH - Populus tremuloides/mesic herbaceous
POTR-UP - Populus tremuloides-upland
RCT - riparian community type
RRE - riverine/riparian ecosystem
RRH - riverine/riparian habitat
SALIX/CAREX - Salix spp./Carex spp.
SALIX/CB - Salix spp./cobble bar
SALIX/DWM - Salix spp./down woody material
SALIX/GB - Salix spp./gravel bar
SALIX/SB - Salix spp./sand bar
SALIX/MH - Salix spp./mesic herbaceous
SCMI - Scirpus microptera
SB - sand bar
SIB - silt bar
TC - Tabor Creek
TYLA - Typha latifolia

1.0 INTRODUCTION

This document is a product of an ongoing study funded mostly by the Nevada Department of Wildlife and directed by Dr. W.S. Platts, Fishery Biologist, U.S. Forest Service Intermountain Research Station (IRS) in Boise, Idaho. The products of the ongoing study will include a hierarchical classification and inventory of riverine/riparian habitats (RRHs) for portions of the Humboldt River watershed in northern Nevada.

Results of a preliminary classification and inventories of RRHs for four Livestock/Fisheries Study Areas (LFSAs) are presented in this document.

Some frequently used terms are defined as follows:

Riverine ecosystem: land contained within the channel of a stream; includes streambanks, streambars, and the streambottom; substrates are fluvial sediments with a low degree of soil development.

Riparian ecosystem: land transitional between aquatic (stream) and upland ecosystems that are characterized by hydric soil and distinctive vegetation requiring free or unbound water (Bureau of Land Management 1986); normally includes the floodplain and areas wetted by springs.

Riverine/riparian ecosystem (RRE): the union of riverine and riparian ecosystems; for a given watershed there is a single RRE.

Riverine/riparian habitat (RRH): ^{types} ~~some~~ functional subset of a RRE; generally comprised of several contrasting ^{stream} ~~stream~~ and riparian types; ~~the diversity within RRHs varies as a function of the scale of perspectives.~~

Riparian community: areas characterized by a distinctive assemblage of obligate and/or facultative hydrophytic plant species and soils that are saturated by ground water within the rooting depth of vegetation during some portion of the growing season.

Riparian community types (RCTs): concepts based on floristic similarities in both the overstory (if present) and the understory of riparian communities (Youngblood et al. 1985).

Streambank: the interface between riverine and riparian ecosystems; limits the lateral extent of streamflow during periods of moderate to high streamflow.

Other important terms are presented in bold type and defined in context.

The products of this preliminary classification include: (1) a legend of RCTs; (2) a dichotomous key for identification of RCTs; (3) descriptions of RCTs; (4) inventories of RCTs for LFSAs; and (5) summaries of inventory data. These results will be integrated with measurements of channel morphology, forage utilization and fish populations conducted by colleagues at the IRS. The pooled data base will be used to test hypotheses concerning the influence of grazing upon RRHs and their values to fish and wildlife.

While the focus of this preliminary classification is the identification of discrete riparian community types (RCTs), studies to order RCTs into a more comprehensive hierarchical classification are ongoing. As a prelude to the classification and inventory of RCTs, a broad-scale hierarchical classification is discussed.

2.0 CLASSIFICATION CONCEPTS

John Stewart Mill (1891) described classification as a conceptual method of arranging objects into groups (**taxa**), and these groups into orders (**taxonomy**), that are most conducive to understanding the objects and relationships between them. A hierarchical structure is conducive to understanding relationships among taxa from several perspectives or levels of resolution, ranging from broad to finite.

At the broadest level of resolution, taxa are riverine/riparian ecosystems (RREs), distinguished by the hydrographic boundaries of watersheds. Intermediate levels of classification are used to stratify watersheds based on geologic, geomorphic and hydrologic criteria influencing the functional character of riverine/riparian habitats (RRHs). At the most finite level of resolution, taxa are riparian community types (RCTs), which

are characterized by distinctive floristic composition, and **aquatic habitat types**, characterized by distinctive structure, composition and dynamics. Preliminary hierarchical levels for classification of RRHs are:

Hydrographic unit: watersheds drained by a named stream or group of streams.

Geologic unit: portions of watersheds that are of similar geologic structure and composition.

Geomorphic unit: portions of geologic units that are of similar geomorphic structure and composition.

Water regime: areas distinguished by the frequency and duration of flooding, the dynamics of alluvial groundwater, and/or saturation by spring discharge.

Physiognomic class: areas distinguished by the life form of the uppermost strata of vegetation with greater than 30 percent canopy cover; nonvegetated areas are distinguished based on the dominant size-fraction of the substrate.

Riparian community type (RCT): areas distinguished by a distinctive assemblage of vegetation including obligate and/or facultative hydrophytes; RCTs recur on areas of similar climatic, geologic, geomorphic, and hydrologic character.

Aquatic habitat types (AHT), the most finite taxa of the riverine ecosystem, will be identified in the context of resolute geomorphic classes. Aquatic habitat types will be described in subsequent documents.

Preliminary classes for each hierarchical level are subsequently discussed. It is expected that the hierarchical classification will be refined through relevations garnered in ongoing studies.

2.1 Hydrographic Classes

Hydrographic units denote watersheds. It is self-evident that the RRE is a continuum from headwater source to sink. Changes in the dynamics at any point, whether natural or man-caused, are communicated dynamically

throughout the continuum, most notably in the direction of streamflow. Hydrographic units are inclusive of this continuum.

Several levels of hydrographic units will be used to identifying parts of watersheds at increasing degrees of resolution. Preliminary classes of hydrographic units are listed below. Projected scales for mapping and interpretations are noted.

Region: the watershed of the highest order streams draining to the ocean or, for the Great Basin Region, the watersheds lacking external drainage to the sea; 1:1,000,000 to 1:3,000,000 scale.

Subregion: the watershed of major streams draining regions or, for the Great Basin, the amalgam of watersheds of similar hydrographic character; 1:500,000 to 1:1,000,000 scale.

Basin: a watershed subset to a subregion or, for the Great Basin, a watershed draining to a particular sink; 1:250,000 to 1:500,000 scale.

Subbasin: a watershed subset to a basin; 1:100,000 to 1:250,000 scale.

Tributary basin: a watershed subset to a subbasin; 1:24,000 to 1:100,000 scale.

Fork: a watershed subset to a tributary basin; $\leq$ 24,000 scale.

Hydrographic Regions of the West are identified in Figure 2-0. Most of the study area is within the Humboldt River Basin of the Lahontan Basins Subregion of the Great Basin Hydrographic Region (see Figures 2-1 and 2-2). Minor portions of the Salmon Falls Basin of the Snake Subregion of the Columbia Hydrographic Region are also included.

The Great Basin Hydrographic Region is a vast area with no external drainage to the ocean. Hydrographic Subregions of the Great Basin are distinguished based on similarities in physiographic and hydrologic characters. The Lahontan Basins Subregion, named for the inland lake which inundated basins below 5,000 feet elevation during the Pleistocene, is further divided based on contemporary watersheds of the Humboldt, Quinn,



Figure 2-0.
Hydrographic Regions of the West.

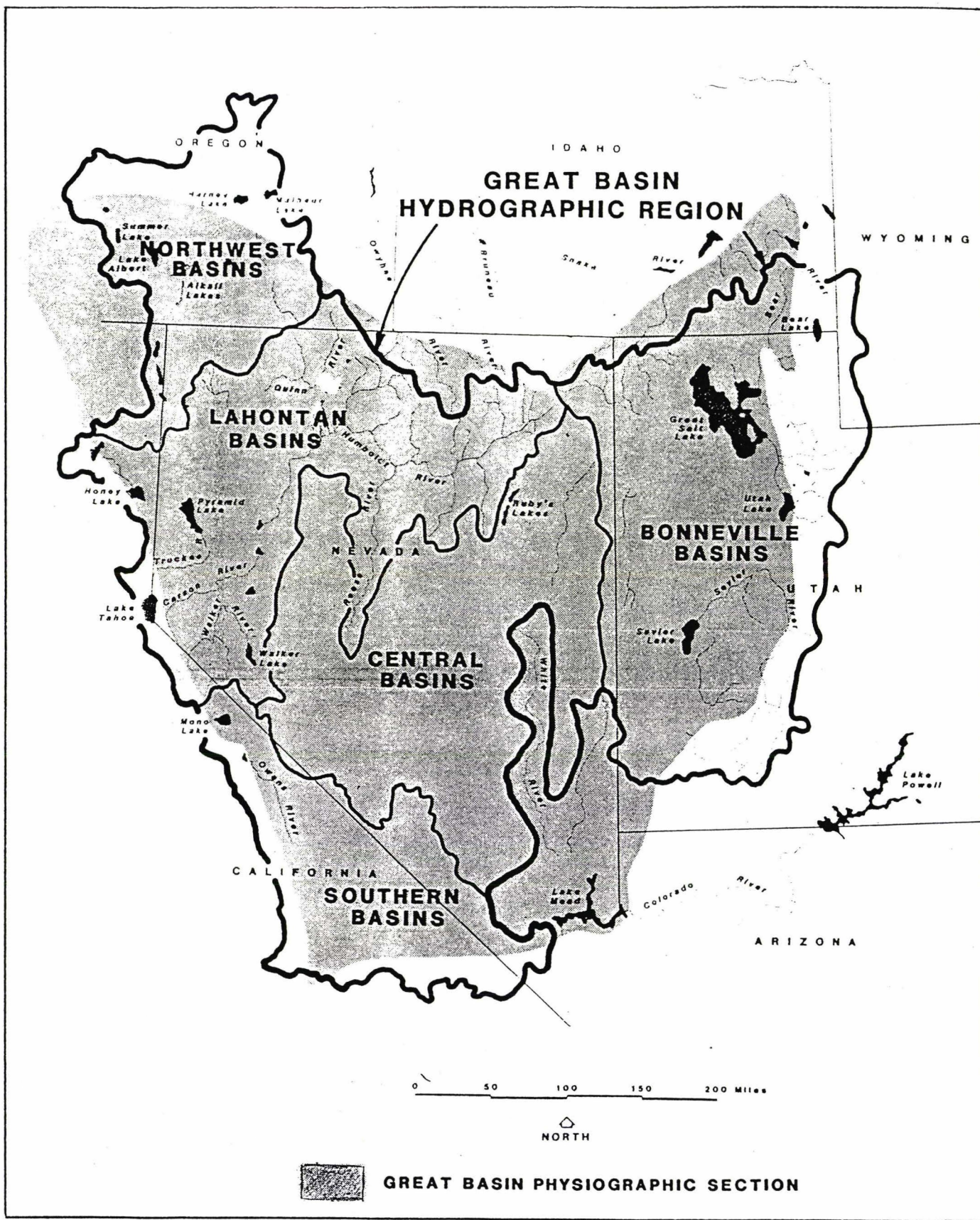


Figure 2-1. Subregions of the Great Basin Hydrographic Region.

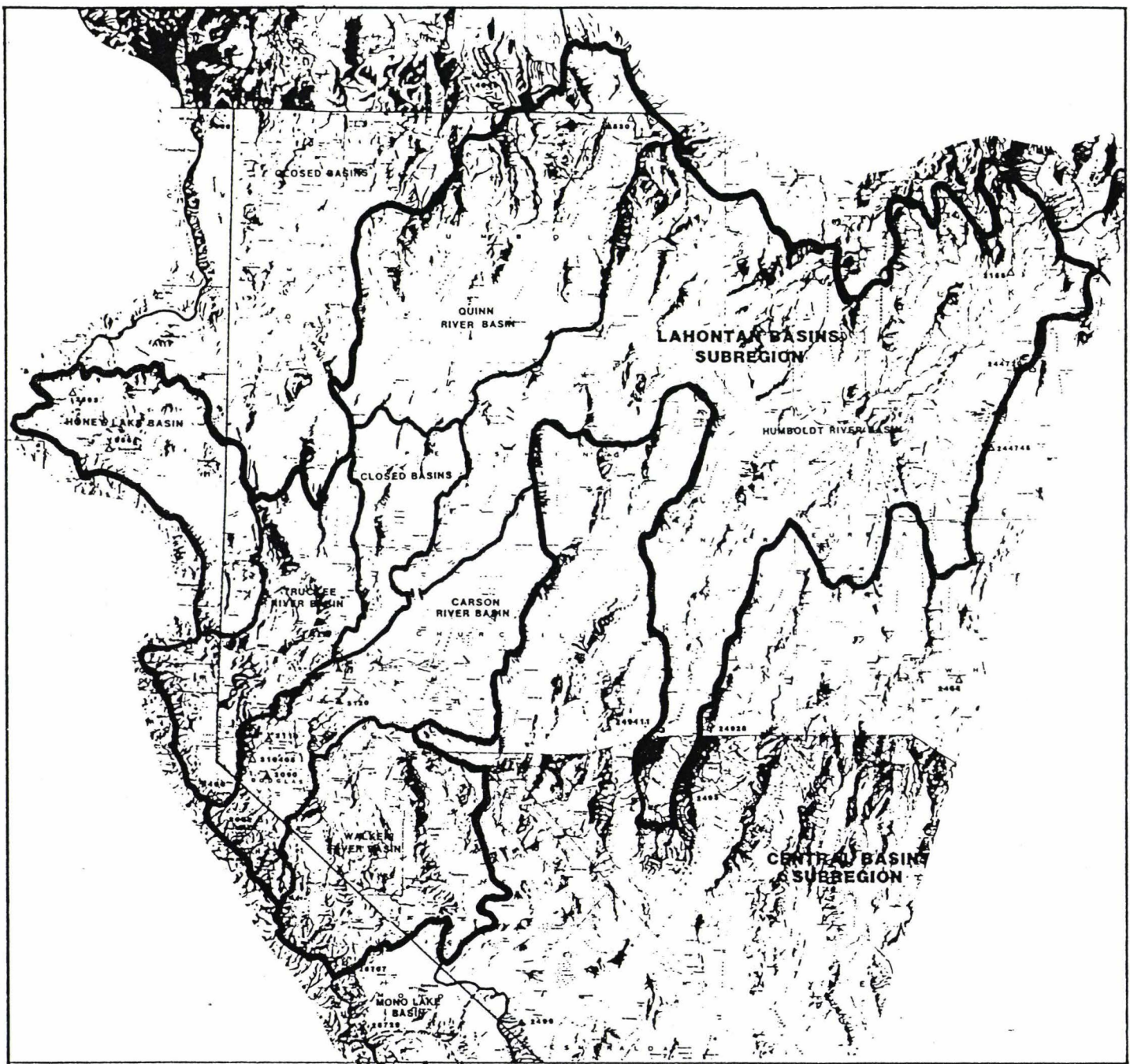


Figure 2-2. Hydrographic Units of the Lahontan Basin Subregion.

Truckee, Carson, and Walker rivers; an area that does not drain to a major stream is also included. Two LFSAs are located in the Humboldt Basin of the Lahontan Basins Subregion of the Great Basin Hydrographic Region.

The Columbia Hydrographic Region is a vast area including most of Idaho, Oregon, Washington and minor parts of Montana and Nevada (see Figure 2-3). Two LFSAs are located in the Salmon Falls Basin of the Snake River Basin of the Columbia Hydrographic Region.

2.2 Geologic Classes

Geologic structures form the elevational gradient to which runoff responds and dictate the distribution of springs, lakes and the courses of rivers and are thus of fundamental importance for understanding the distribution of contrasting RRHs. For areas of similar geologic structure, differences in surficial rock types, the parent materials of soil and sediment, also influence the form, composition, and dynamics of RRHs. Preliminary geologic classes and appropriate scales for mapping and interpretations are:

Physiographic province: a region of similar geologic structure and climate with relief that differs from that of adjacent regions (Fenneman 1931); 1:1,000,000 to 1:3,000,000 scale.

Physiographic section: a subset of a physiographic province used to identify areas with a more discrete range in geologic structure and climate (ibid.); 1:500,000 to 1:1,000,000 scale.

Physiographic subsection: a subset of a physiographic section used to identify areas with still more discrete range in geologic structure and climate (ibid.); 1:250,000 to 1:500,000 scale.

Rock type: areas of similar surficial mineral composition that weather to form sediments of distinctive size-fractions and mineral composition under similar climate; 1:24,000 to 1:250,000 scale.

From a broad perspective, physiographic provinces denote the fundamental geologic structures of the West (see Figure 2-4). The Rocky Mountains

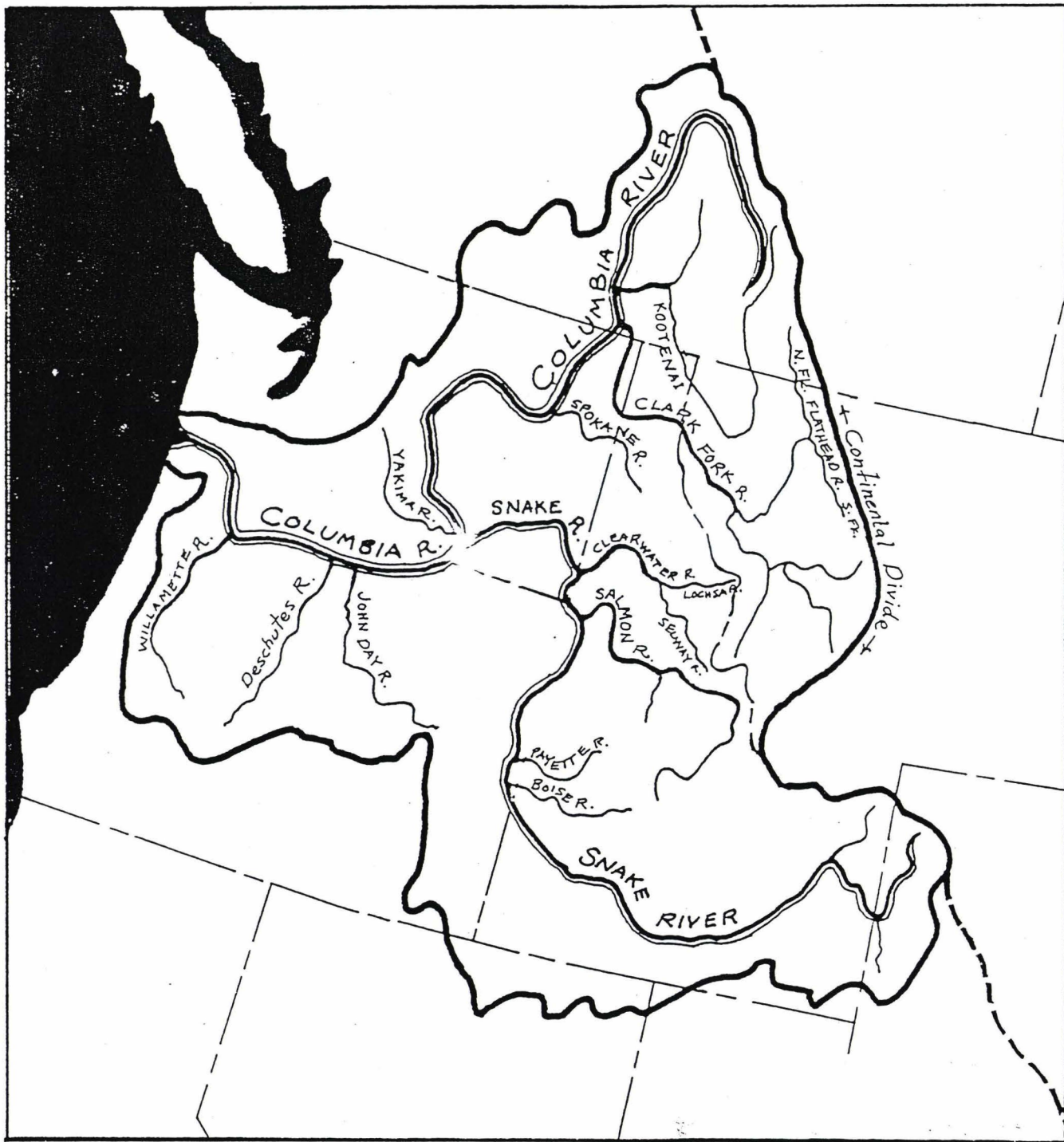


Figure 2-3. Columbia Hydrographic Region.

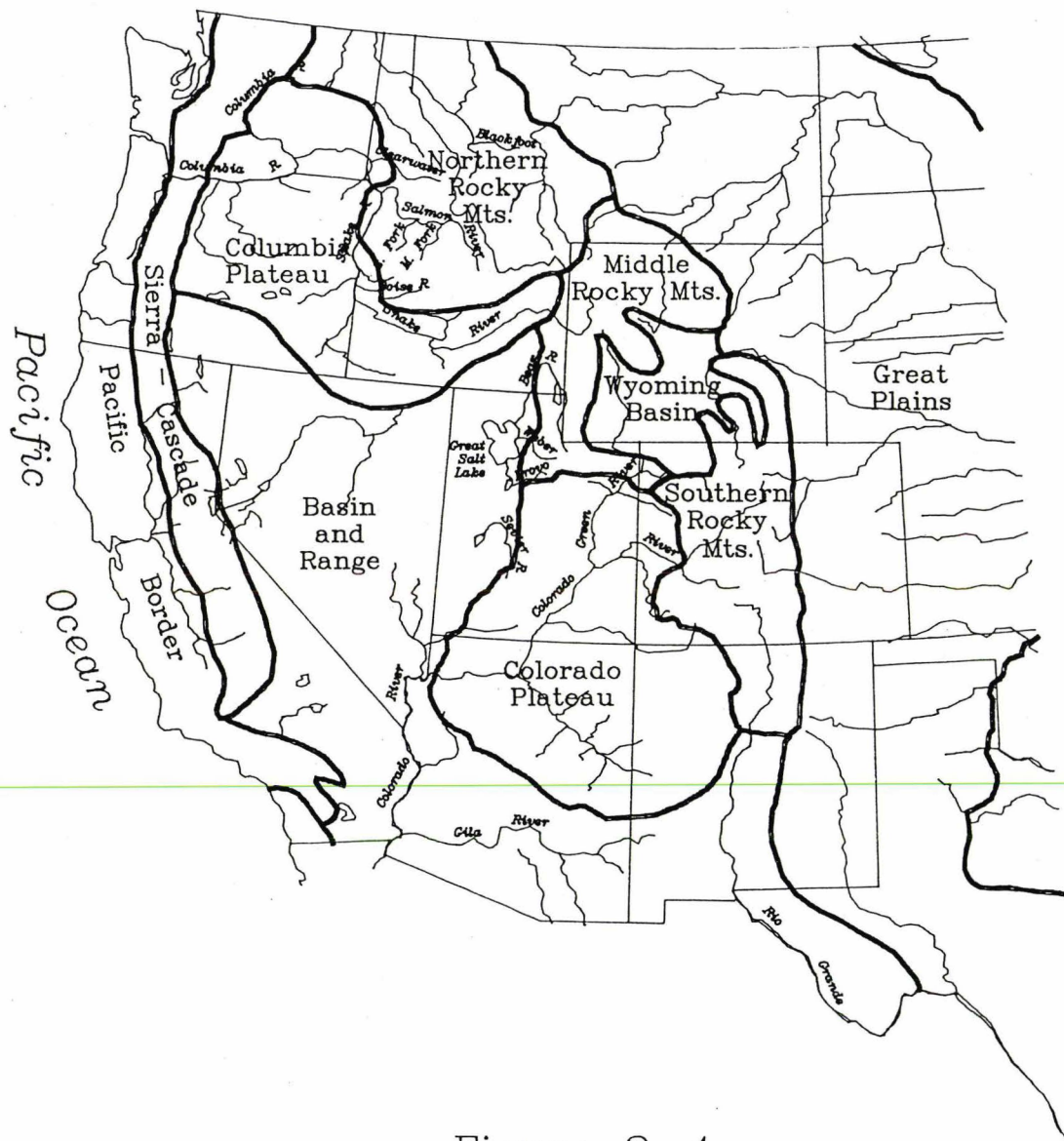


Figure 2-4.
Physiographic Provinces of the West.

form the backbone of the continent; the Columbia Plateau is an extensive lava plain; the Basin and Range is a vast arid area characterized by numerous ranges separated by broad basins; the Colorado Plateau is an uplifted plateau characterized by nearly horizontal sedimentary and volcanic strata that are incised by deep canyons; and the Sierra-Nevada forms the western rim of the Intermountain Region. The study areas are contained within the Basin and Range Physiographic Province.

Physiographic provinces are further stratified as physiographic sections and subsections, according to more specific divisions of geologic structure and climate (ibid.). The four LFSAs are located in the Lahontan Subsection of the Great Basin Section of the Basin and Range Physiographic Province (Figure 2-5).

The most resolute geologic classes, rock types, are named based on the dominant parent material of riparian soil and channel substrates. Where watersheds traverse an assortment of contrasting rock types, as is typical for higher order streams, the parent material is mixed.

In the upper Marys River watershed, extensive exposures of rhyolite has weathered to course-sand and cobble size-fractions, with scant gravel and fine-textured sediments. In contrast, areas of mixed rock types, such as the Independence Mountains, produce a preponderance of gravel and fine-textured sediments. The differences in the size-fractions of weathering products have a pronounced influence on geomorphic and hydrologic character of RRHs. Mixed rock types dominate the watersheds of three LFSAs; the watershed of one LFA is dominated by siliceous volcanic (rhyolite) rocks.

A similar approach to stratification of land according to geologic structure is incorporated in the Land Systems Inventory (Wendt et al. 1975).

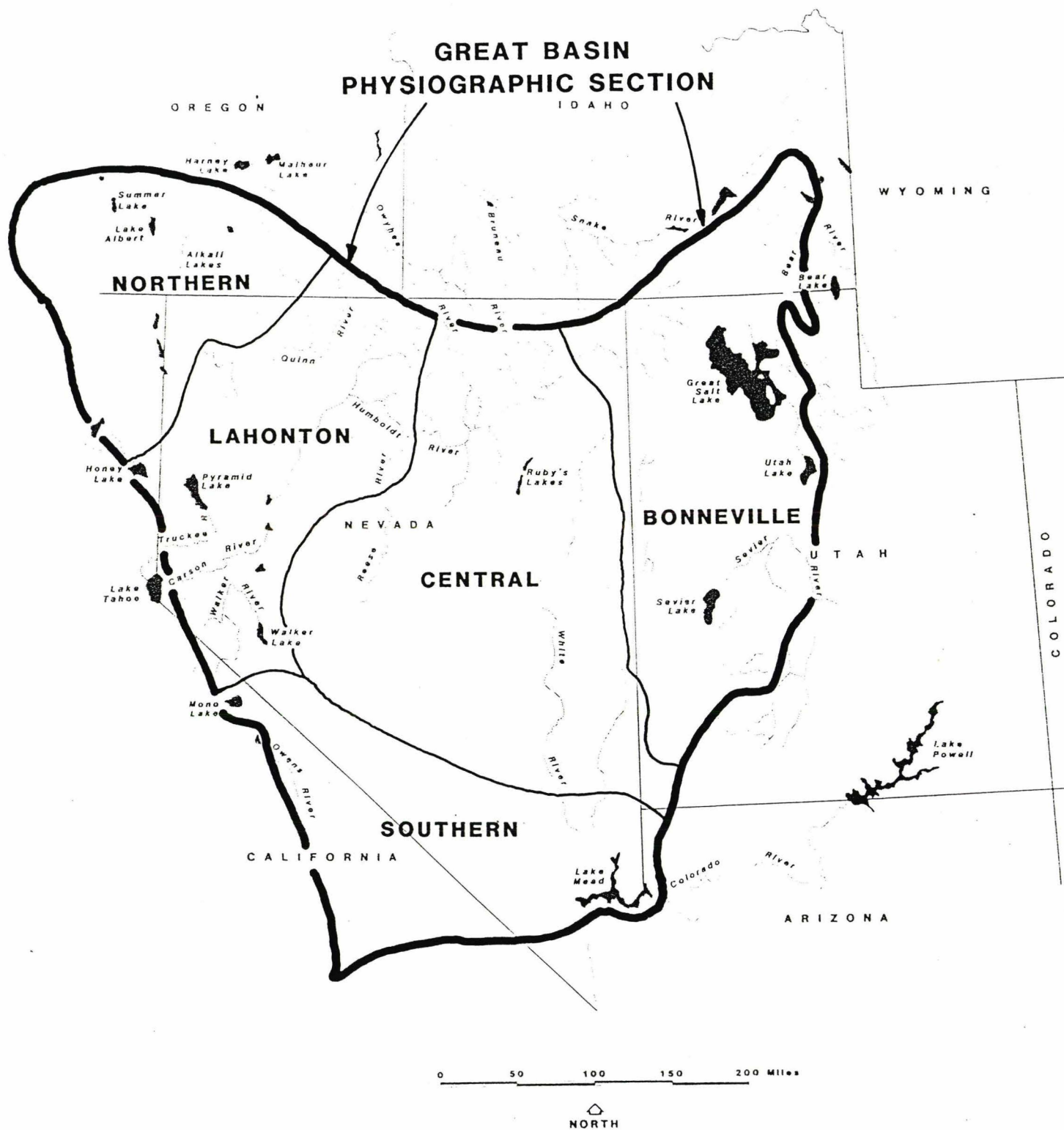


Figure 2-5. Physiographic Subsections of the Great Basin Section of the Basin and Range Province.

Physiographic provinces, sections and subsections are identified at the broadest levels of inventory. Physiographic subsections are further stratified according to manifest criteria of landform (ibid.) as will be discussed with respect to geomorphic classes (Section 2.3).

2.3 Geomorphic Classes

Geomorphic classes are used to stratify geologic classes into more resolute categories. The Land Systems Inventory (Wendt et al. 1975) identifies 3 levels, distinguished by manifest criteria of landform and soil. Levels of geomorphic classes, modified from those identified in the Land Systems Inventory are:

Landtype Association: Identified based on the principal geomorphic mechanism (e.g., glacial, fluvial, alluvial or lacustrine) apparent in landscapes; 1:60,000 to 1:125,000 scale.

Landtype: Identified based on the principal geomorphic process (i.e., erosion or deposition) characterizing landforms; 1:24,000 to 1:60,000 scale.

Landtype Phase: Identified based on differences in potential bank-forming communities and soil types; 1:2,000 to 1:24,000 scale.

Phase Modifiers: Identified based on criteria that are responsive to management applications and that are related to the values of both stream and riparian habitats; criteria may vary based on the landtype or the type of management considered; potential criteria for identification include the condition of streambanks, the extent of streambars, and the degree of channel incision or aggradation relative to the floodplain; $\leq$ 1:2,000 scale.

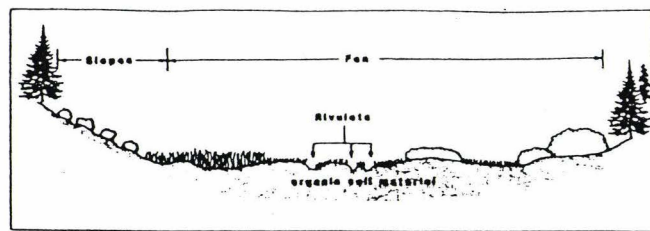
Preliminary geomorphic classes identified during an aerial reconnaissance of portions of the Humboldt River watershed are listed in Table 2-1.

The relationships between stream stage and groundwater level may often be interpreted as a function of geomorphic valley-form (see Figure 2-6). The coarse substrate characteristic of glacial valleys is conducive to rapid equilibration of groundwater and streamflow levels. Alluvial aquifers may

Table 2-1. Preliminary geomorphic classes.

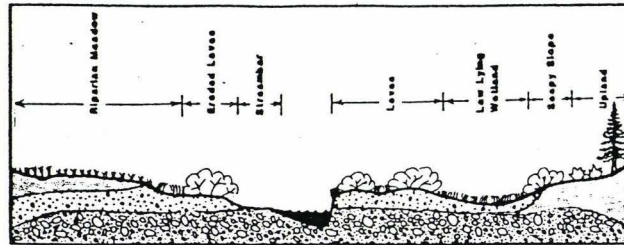
Landtype Association
Landtype
Landtype Phase
Phase Modifiers

Glaciated Lands
Glacial Basins (Headwaters)
Glacial Valleys
Confined Floodplain
Confined Channel
Fluvial Canyons
V-shaped Canyons
Zone of fluvial erosion (floodplains absent)
Zone of fluvial deposition (floodplains present)
Incised Channel
Graded Channel
Aggraded Channel
Notch-shaped Canyons
Zone of erosion (floodplain absent)
Zone of deposition (floodplain present)
Alluvial Valleys
Unconfined Floodplains
Incised Channel
Graded Channel
Aggraded Channel
Confined Floodplains
Incised Channel
Graded Channel
Aggraded Channel
Lacustrine Basins
Open
Closed

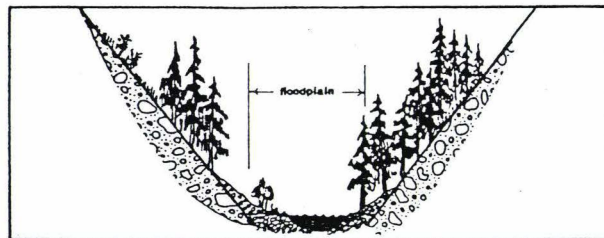


HEADWATER BASIN

Glacial Valleys

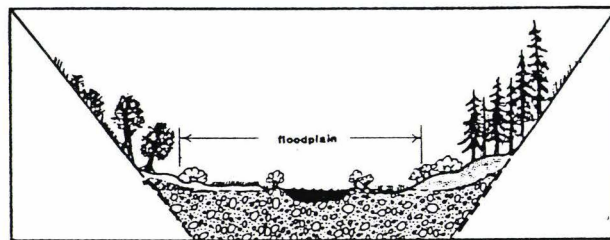


ZONE OF TRANSPORT AND DEPOSITION

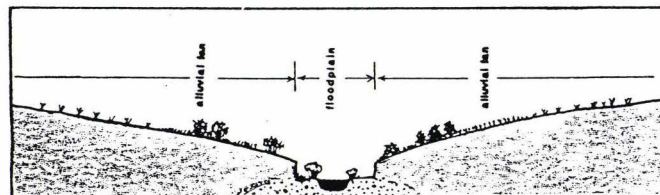


EROSIONAL SEGMENT

Fluvial Canyons

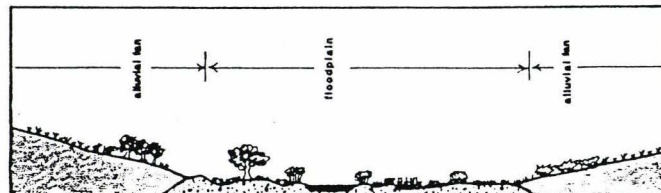


DEPOSITIONAL SEGMENT



CONFINED FLOODPLAIN

Alluvial Valleys



UNCONFINED FLOODPLAIN

Figure 2-6. Some Preliminary Geomorphic Classes

be laterally restricted along erosional segments of fluvial (V-shaped) canyons incised in bedrock. The relationship between groundwater and streamflow levels in depositional segments of fluvial canyons may vary seasonally, with alluvial aquifers discharging to stream channels during the spring and streamflow discharging to alluvial aquifers during the summer. Excessive bedloss in broad alluvial valleys generally results in diminished groundwater levels with increasing distance from the stream channel. The relationships between geomorphology and groundwater dictate the dynamics of water regimes and the morphology of RRHs.

Criteria for identification of geomorphic types and inventories of their distribution for portions of the Humboldt River watershed will be developed in the course of ongoing studies. Hydrologic interpretations for geomorphic classes will be discussed in subsequent documents.

The concepts for aquatic habitat types (AHTs), the most resolute classes of the riverine ecosystem, will be identified at the most finite level of geomorphic classification. Evaluation of these relationships is ongoing and will be reported in subsequent documents.

2.4 Water Regimes

Water regimes will be identified at the most resolute scale of mapping ($\leq 1:2,000$ scale) to denote (1) the duration and frequency of surface flooding; (2) saturation of the ground surface; or (3) groundwater levels that fluctuate to within the rooting depth of vegetation. The distribution of riparian communities along the lateral gradients of watersheds is largely a response to water regime. The summation of areas of discrete water regimes for geomorphic categories (e.g., landtypes) may be used to develop hydrologic interpretations for larger scale classes. Preliminary classes of water regime are amended from those used to classify wetland ecosystems (Cowardin et al. 1979). These are as follows:

Permanently flooded: shallow water covers the surface throughout the growing season; the depth of water is less than that restrictive to establishment of wetland vegetation.

Semipermanently flooded: shallow water covers the surface throughout most of the growing season.

Saturated: the substrate is saturated to the surface for extended periods of the growing season but surface water is seldom present; commonly associated with springs and seeps.

Seasonally flooded: the surface is flooded for extended periods during spring runoff of most years, but surfaces are dry by the end of most growing seasons; commonly associated with floodplains.

Intermittently flooded: the surface is frequently flooded for brief intervals due to minor fluctuations in stream discharge; infrequent flooding may occur during any period of the growing season; commonly associated with streambars and features within the stream channel.

Subirrigated: the surface is seldom flooded but groundwater level is within the rooting depth of vegetation for some period of the growing season; commonly associated with the toes of alluvial landforms and with stream terraces.

Preliminary classes of water regime are illustrated in Figure 2-7.

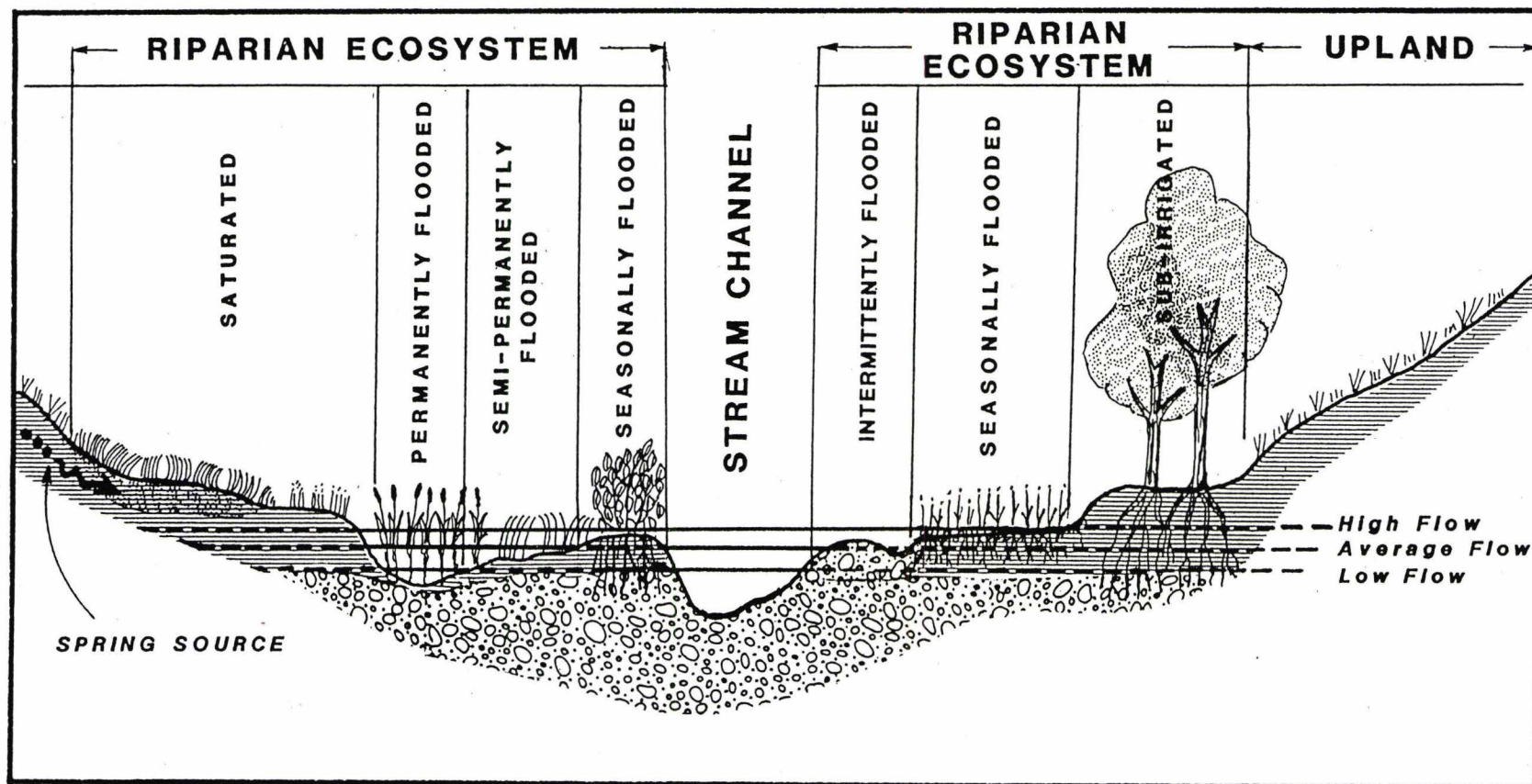


Figure 2-7. Water Regimes

2.5 Physiognomic Classes

The physiognomy of riparian habitats is based on the life form of the uppermost stratum of vegetation with an aerial cover of at least 30 percent or upon the composition of the substrate, if the cover of vegetation is less than 30 percent (Cowardin et al. 1979). Physiognomic classes identified at the most resolute scale of mapping ($\leq$ 1:2,000 scale) may be aggregated for geomorphic classes (e.g., landtypes) to interpret potential values and uses. Preliminary physiognomic classes, amended from those used in the National Wetlands Inventory (ibid.), are:

Forested: the canopy of woody vegetation covers greater than 30 percent of the ground surface and trees (greater than 20 feet tall) are dominant.

Shrub: the canopy of woody vegetation covers greater than 30 percent of the ground surface and shrubs (less than 20 feet tall) are dominant.

Herbaceous: forbs, grasses, moss and lichen cover greater than 60 percent of the ground surface and herbaceous vegetation is dominant; woody vegetation covers less than 30 percent of the ground surface.

Streambar: occurs within the stream channel; vegetation covers less than 60 percent of the ground surface; subclasses are named based on the particle-size distribution of the mineral substrate (e.g., cobble bar, gravel bar, sand bar, silt bar).

Nonvegetated areas not conforming to the above concepts may be grouped as miscellaneous land types (e.g., roads, mine tailings, etc.).

2.6 Community Types

Community types are concepts based on floristic similarities in both the overstory (if present) and the understory of riparian communities (Youngblood et al. 1985) and constitute the most finite level of classification. Community types are identified at the most resolute scale of mapping ($\leq 1:2,000$ scale). Community types may be aggregated into two types of map units:

Complexes: map units comprised of two or more contrasting types that cannot be delineated separately at the scale of mapping.

Associations: map units comprised of two or more types that can be delineated at the scale of mapping, but which are combined based on similarities in values or the response to management activities.

While descriptions of riparian communities should include climatic, geologic, topographic, hydrologic, geomorphic, soil and floristic parameters, the identification of riparian community types is based on the presence/absence and cover of a few indicator species with high constancy. The concept of riparian community types is often not applicable to severely impacted areas, such as are common throughout the Great Basin. In these cases, the potential riparian community type may be inferred from soil, hydrologic, and geomorphic criteria.

3.0 LIVESTOCK/FISHERIES STUDY AREAS (LFSAs)

The four LFSAs located in northeastern Nevada are: (1) Deer Creek (DC); (2) North Fork Cottonwood Creek (NFC); (3) Tabor Creek (TC); and (4) Gance Creek (GC). The locations of LFSAs are illustrated in Figure 3-1.

The climate of northern Nevada is semiarid with warm summers and cold winters. Average annual temperature at Elko, Nevada (elevation 5,100 feet) is about 46°F and mean annual precipitation is about 9 inches, much of which falls as snow (NOA 1975). Precipitation varies considerably in response to elevation, latitude and aspect relative to the eastward trending storm tracks. Potential evaporation exceeds precipitation by orders of magnitude.

Brief descriptions of the hydrography, geology, geomorphology, soil and flora of each LFSA follow.

3.1 Deer Creek (DC) Study Area

Deer Creek arises as three forks (West Fork, Middle Fork and East Fork). The DC study area is located along the West Fork, which originates from springs at about 6,600 feet elevation. A wetland, located immediately below the springs and extending about half a mile down-drainage, regulates discharge to lower West Fork. West Fork flows in a narrow, V-shaped canyon that is cut in mid-Tertiary volcanic rock (rhyolite) to its confluence with Deer Creek at 6,000 feet, elevation. The average gradient of the canyon bottom is 2 to 3 percent. Deer Creek converges with Sun Creek, a tributary of South Fork Salmon Falls Creek, about 1.8 miles below the confluence with West Fork.

The DC study area is located near the midpoint of West Fork at an elevation of about 6,200 feet. Along much of the LFSA the stream channel

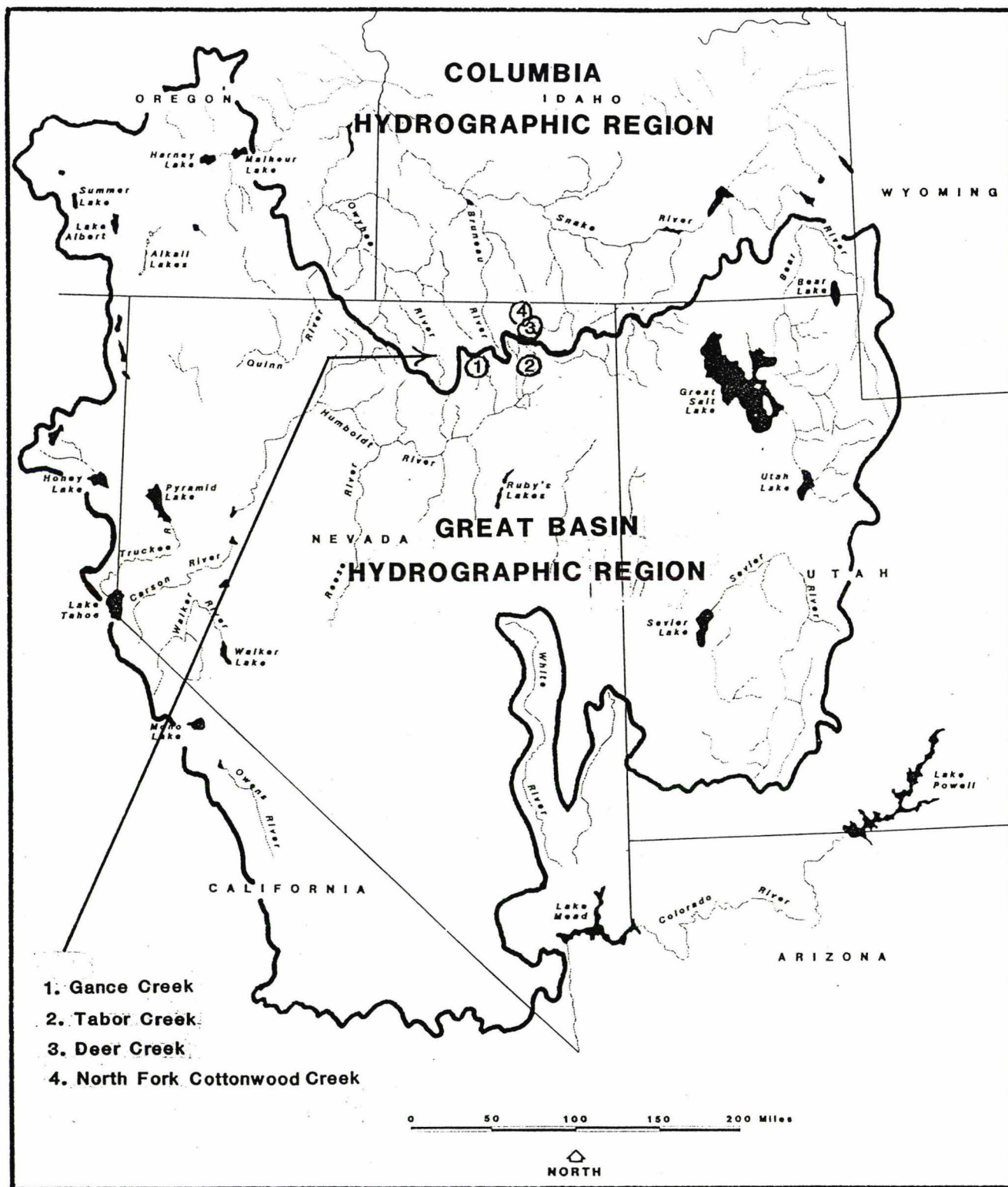


Figure 3-1. Location of Study Sites in Nevada

is flanked by residual slopes or alluvial fans. Narrow, discontinuous floodplains also occur contiguous to the stream channel.

Soils and substrates were weathered from volcanic rock (rhyolite). Soils on residual slopes are shallow to moderately-deep and fine-textured, with slopes of 15 to 60 percent. On alluvial fans, soils are deep to very deep, fine textured and with slopes of 5 to 25 percent. On floodplains, soils are stratified fine and medium textured sediments that are nearly level. Streambars are mostly soil and cobble size sediment; gravelly substrate is notably absent in the vicinity of the Deer Creek LFSA, presumably due to the weathering characteristics of the volcanic parent material.

The alluvial aquifer extends only a short distance from the stream channel, apparently due to the low permeability of the valley substrate. Streamside vegetation included forested habitats dominated by aspen, shrub habitat dominated by willows and sagebrush, and herbaceous habitat dominated by grasses. Nonvegetated streambar habitats were common within the stream channel.

The DC study area is divided into 3 grazing treatments. The upstream and downstream segments have been grazed by cattle while livestock has been excluded from the middle segment since about 1977.

3.2 North Fork Cottonwood Creek (NFC) Study Area

North Fork Cottonwood Creek arises on the eastern flank of the Jarbridge Mountains at about 8,500 feet elevation. The upper reach flows through a steep gradient (6 to 8 percent), narrow canyon incised in rhyolite and is intermittent. The middle reach is perennial and is flanked by a narrow band of Quaternary alluvium nestled between tuffaceous sedimentary

uplands. Along its lower segment, North Fork Cottonwood Creek flows through an alluvial valley with an average gradient of less than 2 percent before merging with Cottonwood Creek at about 6,000 feet elevation. The NFC study area is located along the upstream part of the Alluvial valley at about 6,200 feet elevation.

Broad alluvial fans with slopes of 2 to 5 percent confine the stream channel along most of the LFSA. Narrow, discontinuous floodplains are also common. Extensive streambars border the stream along most of the LFSA.

Soils and substrates were weathered from mixed parent materials. Alluvial soils formed in very deep, gravelly loam sediment. Floodplains are lenses of gravel stratified in thicker layers of loamy sediments that overlay fragmental substrate. Streambars are gravelly and cobbly substrate. Streamflow and alluvial aquifers are thought to be depleted through bedloss and deep percolation.

Shrub habitats dominated by willow (Salix spp.) and herbaceous habitats dominated by obligate and facultative hydrophytic grasses are common on the discontinuous remnants of floodplain. Extensive streambars border the stream along most of the NFC study area. Alluvial positions, which may be flooded for brief intervals of some seasons, support big sagebrush (Artemisia tridentata), complimented by facultative hydrophytes and upland grasses and forbs.

The NFC study area, established in 1985, is divided into three grazing treatments. Pasture contiguous to the upper and lower 200 foot segments of the stream are grazed under existing management. Cattle have been exclosed from the middle segment of this LFSA since 1985.

3.3 Tabor Creek (TC) Study Area

Tabor Creek originates from springs emanating from the west flank of the Snake Mountains at about 7,800 feet elevation. The upper 5.6 mile segment of Tabor Creek, down to about 6,600 feet elevation, flows through a narrow, V-shaped canyon with an average gradient of about 4 percent. The middle 4.5 mile segment, down to about 6,000 feet elevation, meanders through a somewhat wider fluvial canyon with an average gradient of about 2 percent. The lower 26 mile segment flows in a broad alluvial valley with an average gradient of about 0.5 percent. Streamflow in this lower segment is ephemeral, probably due to excessive bedloss, evapotranspiration and irrigation withdrawals. Tabor Creek merges with the Humboldt River at about 5,400 feet elevation.

The TC study area is located along the middle segment of Tabor Creek at about 6,500 feet elevation. Alluvial fans confine the floodplain along much of the segment and confine the stream channel along short reaches. The stream channel is incised 4 to 5 feet below its historic floodplain along the upstream portion of the study area. Streambars are common within the channel.

Soils and substrates were weathered from mixed parent materials. Alluvial soils are very deep, comprised of gravelly lenses stratified with thicker layers of loamy sediment. Floodplain soils are loamy sediments stratified with gravel lenses, overlying fragmental valley-fill. Streambars are mostly extremely gravelly, some veneered with sand.

Streamflow may be augmented by groundwater and surface runoff originating from contiguous uplands during the spring and depleted by bedloss

during the summer. A spring located on the southern flank of the study area flows through early summer and following rainstorms later in the season.

Alluvial landforms are dominated by sagebrush and associated upland herbaceous vegetation. Floodplains are dominated by willow and herbaceous riparian vegetation. Where the stream channel is incised, sagebrush complimented by facultative hydrophytes dominate the floodplain. The spring area is dominated by hydrophytic species. Streambars are vegetated with a diverse assemblage of upland and riparian plant species.

Three grazing treatments are being applied in the TC study area: (1) complete rest; (2) rest-rotation; and (3) continuous seasonal grazing. Cattle have been excluded from one pasture since about 1976. A second pasture has been grazed under a rest-rotation system since 1982. Cattle graze continuously through the summer in the third pasture. For a more thorough discussion of treatments, see Platts and Nelson (1983).

3.4 Gance Creek (GC) Study Area

Gance Creek originates from several springs that discharge along the east flank of the Independence Mountains at about 7,700 feet elevation. The upper 2 mile segment of Gance Creek flows in a narrow, V-shaped canyon with an average gradient of about 8 percent, down to 6,800 feet elevation. The middle 3 mile segment of the canyon is somewhat broader, down to about 6,300 feet elevation, with an average gradient of about 3 percent. The lower 10 mile segment of Gance Creek flows across a broad alluvial landscape with an average valley gradient of about 1 percent before merging with Pie Creek, a tributary of the North Fork Humboldt River.

The GC study area is located along the middle segment of Gance Creek at about 6,600 feet elevation. Residual slopes and alluvial fans confine

the stream channel along part of the LFSA although floodplains are more prevalent. The stream channel is incised 3 to 4 feet below its historic floodplain along the downstream portion of the LFSA. Streambars are common within the stream channel. Several perennial springs discharge along the eastern flank of the LFSA 10 to 15 feet above the floodplain.

Soils and substrates were weathered from mixed rock types. On residual slopes, soils are moderately deep to deep, loamy sediments inclusive of angular rock fragments. On alluvial fans, soils are very deep, loamy sediments stratified with thin lenses of gravel. Alluvial sediments overlies stratified fluvial sediments near the medial-axis of the canyon. Floodplains are stratified layers of loamy sediments and gravel; the thickness of gravel layers generally increases with depth from the surface. Streambars are mostly gravelly substrate, some with a veneer of sand. The spring area on the eastern flank of the study area is characterized by organic soil material ranging from 2 to over 4 feet thick that is underlain by relatively fine-textured, gleyed sediment.

The vegetation on residual slopes is dominated by shrubs, most notably serviceberry (Amelanchier sp.) and snowberry (Symphoricarpos sp.) complemented by upland grasses and forbs. Alluvial fans are dominated by sagebrush. Floodplains are dominated by willow and herbaceous communities inclusive of both obligate and facultative riparian species. The spring area is dominated by sedges (Carex spp.), rushes (Scirpus spp.) and spikerushes (Eleocharis spp.).

The study area includes 1,800 linear feet of stream channel. The upper and lower 600 foot segments of the study area are grazed under deferred management; cattle are excluded from the middle 600 foot segment.

4.0 OBJECTIVES

The purpose of this investigation was to classify and inventory riparian habitats occurring in the four LFSAs. Specific objectives were:

1. Classify riparian communities for the LFSAs.
2. Inventory riparian communities occurring in each LFSa.
3. Process inventory data in a computer-sensible format.
4. Summarize data in a format compatible with research objectives.

5.0 METHODS

Field work was conducted between May and September, 1986. Dr. W.S. Platts, Fisheries Biologist at the Intermountain Research Station in Boise, Idaho directed the field investigation conducted by Sherman Jensen (Soil Scientist/Physical Ecologist) and Frank Smith (Botanist).

5.1 Preliminary Classification

A reconnaissance of each LFSa was conducted and apparently contrasting types of riparian communities were identified. Vegetation, soil, and environmental parameters were described for typical communities of each apparently contrasting type. Descriptive data was tabulated in a computer sensible format and analyzed using clustering techniques to identify preliminary community types.

Table 5-1. Floristic cover classes

Class	Cover
Trace	<1%
1	1% to 5%
2	6% to 10%
3	11% to 15%
4	16% to 25%
5	26% to 50%
6	51% to 75%
7	>75%

5.1.1 Floristic Descriptions and Classification

Plots, 5 by 10 meters in size, were established in locations exhibiting the central tendency of representative communities. Within each plot, the following vegetative parameters were tabulated:

1. Species composition, by life form (tree, shrub, forb, and gram-inoid).
2. Cover class by species.
3. Height by species.

Floristic identifications follow Cronquist et al. (1977) and Welsh et al. (1987). A field guide prepared by Brunsfeld and Johnson (1985) was very useful for identification of willows (Salix spp.). Nomenclature follows Welsh et al. (1987). Unknown species were collected for identification at the Intermountain Herbarium at Utah State University, Logan, Utah.

Estimates of cover (by species) were calibrated by measuring cover in 10 systematically placed 0.1 square meter microplots. Cover classes are identified in Table 5-1.

Species occurring outside of the plot but within the representative community were also noted. An exemplary vegetation description form is included in APPENDIX A.

Floristic data was tabulated into a computer sensible format. As an initial step, sample plots were subjectively arranged into similar groups based on species cover and the expertise of the investigators. A clustering procedure was performed to validate the initial classification.

Cluster analysis was performed on a reduced data matrix. Species with cover greater than 5 percent in at least one sample plot were used. Values were coded to the midpoint of the range for each cover class and transformed by taking the square root. The transformation reduces the influence of species with high cover upon the pairwise resemblance between plots. The Bray-Curtis coefficient (Motyka et al. 1950) was used to calculate the similarity between plots. A CLUSTAR program (Marshall and Romesberg, 1977) was used to calculate the pairwise comparison between plots. A dendrogram was constructed using the unweighted pair-group method of arithmetic averages (UPGMA). Association tables were also prepared.

5.1.2 Soil Descriptions

A soil profile was described to a depth of at least one meter, or to a depth below the groundwater level (gwl) if shallower than one meter. The locations of soil pits were chosen to represent the central character of the community. Methods of profile description were those used by the Soil Conservation Service (USDA-SCS 1981). Definitions and abbreviations were adopted from "Definitions and Abbreviations for Soil Descriptions" (USDA-SCS 1979). Soils were classified according to criteria presented in Soil Taxonomy (USDA-SCS 1975). Descriptions were used to ascertain the soil and

hydrologic characters typical of preliminary riparian community types. An exemplary soil description is included in APPENDIX A.

5.2 Inventory of Riparian Communities

Two approaches to inventory of riparian communities for LFSA were applied: (1) mapping from low-elevation, color infrared (CIR) aerial photos; and (2) on-site identification and measurement of RCTs along transects that were established by colleagues at the Intermountain Research Station.

5.2.1 Mapping

Riparian and upland communities were delineated on low-elevation, CIR aerial photos for Deer Creek, Tabor Creek and Gance Creek study areas. Photos were not available for the North Fork Cottonwood Creek study area at the time of report preparation.

Mapping units were delineated using stereo imagery and 2X magnification. The smallest delineations were about 50 square feet in size. Map unit delineations were verified in the field.

Map unit delineations on aerial photo overlays were transferred to computer sensible format using a digitizer and Computer Assisted Design (CAD) software. Maps for each LFSA were generated.

5.2.2 Transects

Streamside communities were identified for transects established by colleagues at the IRS. Transects (see Figure 5-1), each spanning the width of the stream channel and marked with stakes on both right and left stream-banks (facing downstream), were oriented perpendicular to the channel axis. The distance between sequential transect markers on the right side of the

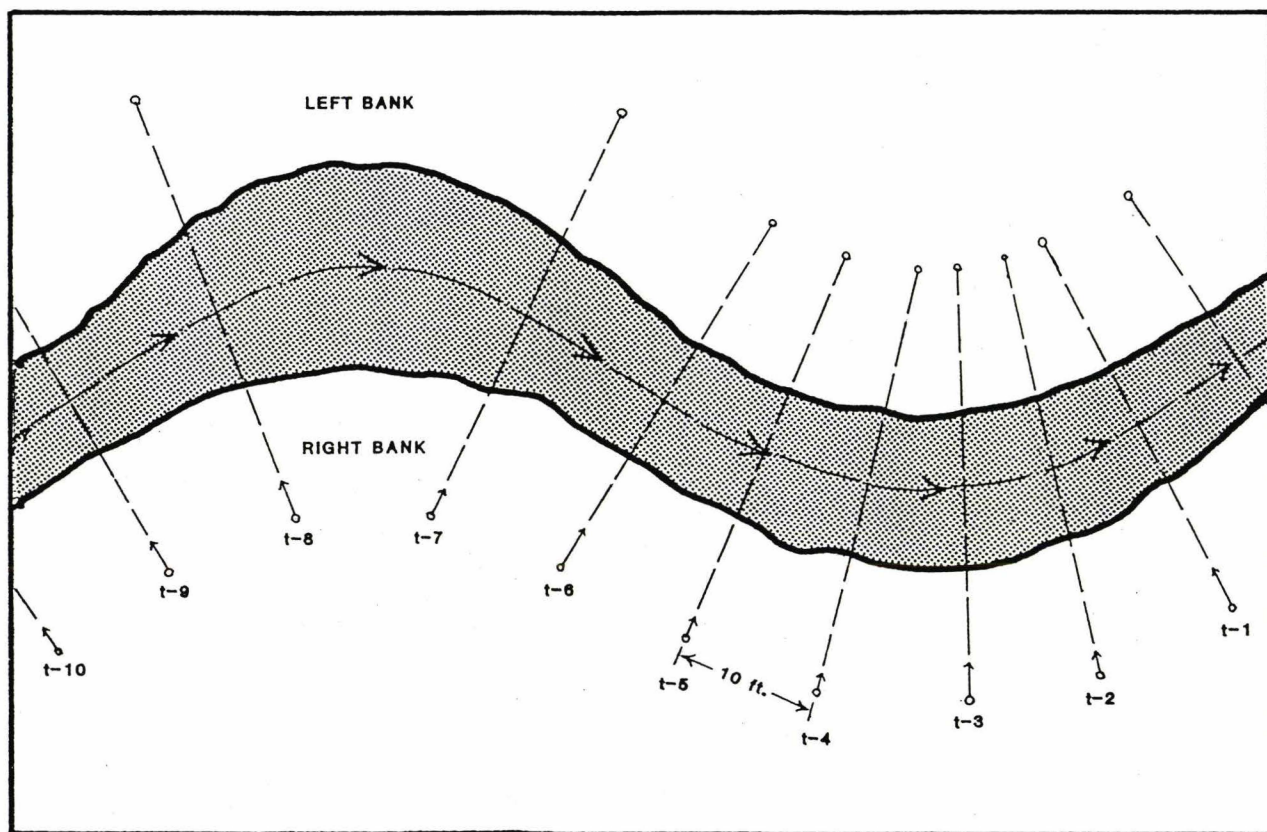


Figure 5-1. Layout of Channel Transects

channel was 10 feet while distances between markers on the left side of the channel varied according to channel curvature.

Streamside communities were identified for each transect from the water's edge to 10 feet beyond the apparent streambank on both sides of the channel (see Figure 5-2). The horizontal distance of each community along transect lines and the horizontal distance from the water's edge to the top of the apparent bank were measured. Commonly, two or more communities were identified along transects for each bank.

Inventory data measured for transects were coded and processed in a computer-sensible format using an IBM Personal Computer and Lotus 1-2-3 software. Data were keypunched twice to prepare replicate data files. A basic program was used to compare replicate files and identify incorrect records, which were corrected. Inventory data were summarized in a format conducive to preliminary interpretations and testing of hypothesis relevant to the effects of livestock grazing upon RRHs.

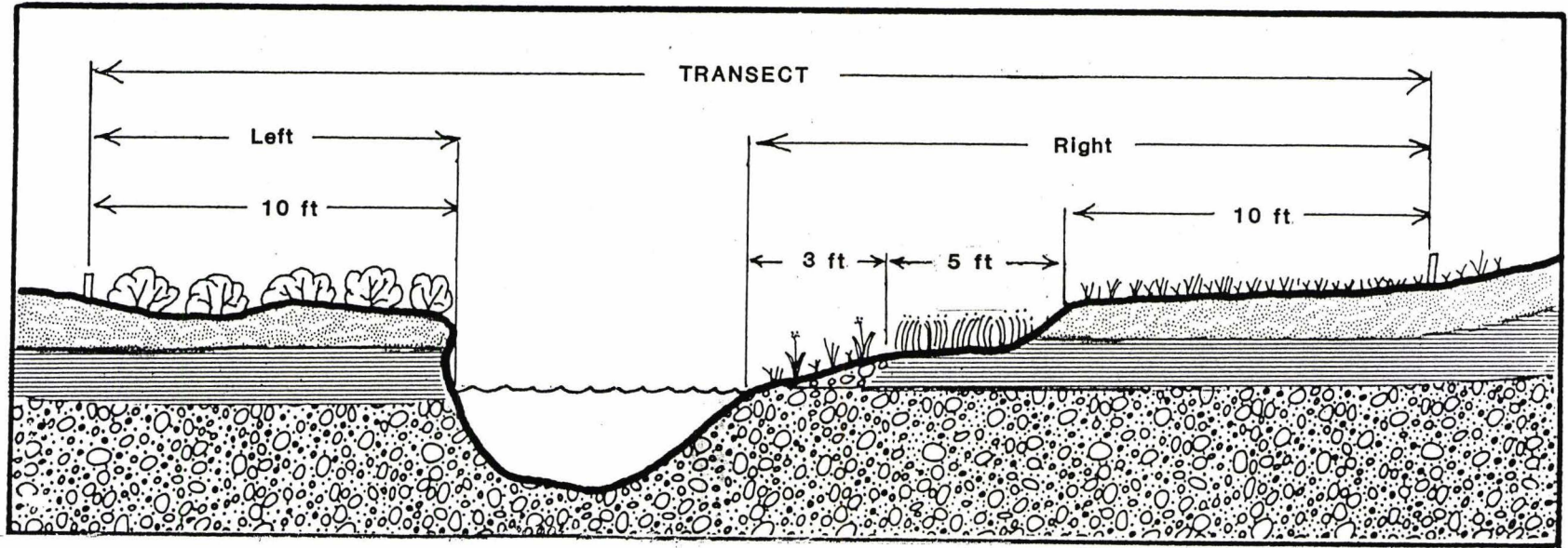


Figure 5-2. Inventory Parameters of Channel Transects

6.0 Preliminary Classification of Riparian Ecosystem

Riparian communities occurred on the floodplain and in areas wetted by springs. Upland habitats occurred on alluvial and residual landforms, but were sometimes streamside. Six major riparian community types (RCTs), 9 minor RCTs, 8 types of streambar habitats, 4 upland types and 5 miscellaneous land types were identified in the vicinities of the LFSAs. Minor RCTs comprised an insignificant portion of the LFSAs areas and were infrequently identified along transects. A legend of preliminary types is presented in Table 6-1.

A dichotomous key for identification of physiognomic classes is subsequently presented. A key for identification of riparian community types (RCTs) follows. Preliminary identifications may be verified by referring to community type descriptions in Section 6.1, synthesis tables of floristic data in APPENDIX B and APPENDIX C, and soil descriptions in APPENDIX D. Families and common names of plant species are listed in APPENDIX E.

Descriptions of riparian community types (RCTs) are presented with respect to physiognomic classes. Concepts of RCTs are based on field descriptions of floristic, soil and environmental parameters for typical communities occurring in the vicinities of the four LFSAs. Brief descriptions of minor RCTs and streamside upland types are also presented. Concepts for RCTs may be refined through subsequent studies.

Table 6-1. Legend.

Physiognomic Class
Acronym - Name

FORESTED HABITATS

POTR/MH - Populus tremuloides/mesic herbaceous RCT
POTR/ARTR - Populus tremuloides/Artemisia tridentata CT
POTR-UP - Populus tremuloides-upland CT

SHRUB HABITATS

SALIX/DWM - Salix spp./down woody material RCT
SALIX/SB - Salix spp./sand bar RCT
SALIX/GB - Salix spp./gravel bar RCT
SALIX/CAREX - Salix spp./Carex spp. RCT
SALIX/MH - Salix spp./mesic herbaceous RCT
ARTR/POPR - Artemisia tridentata/Poa pratensis RCT
ARTR-UPLAND - Artemisia tridentata/upland CT
AMEL-UPLAND - Amelanchier sp./upland CT

HERBACEOUS HABITATS

POPR - Poa pratensis RCT
JUBA - Juncus balticus RCT
CANE - Carex nebrascensis RCT
ELPA - Eleocharis pauciflora RCT
CAVE - Carex vesicaria RCT
SCMI - Scirpus microptera RCT
MIGU - Mimulus guttatus RCT
TYLA - Typha latifolia RCT

STREAMBAR HABITATS

Substrate Types

CB - Cobble bar RCT
GB - Gravel bar RCT
SB - Sand bar RCT
SIB - Silt bar RCT

Herbaceous Streambar Types

HGB - Herbaceous gravel bar RCT
HSB - Herbaceous sand bar RCT

Bank Types

EB - Eroded bank
SLUMP - Slumped bank

MISCELLANEOUS HABITAT TYPES

DWM - Down woody material
H2O - Water
ROAD - Road
ROCK - Rock or boulder
TAILING - Mine tailing

* Major types are noted in bold face type

KEY TO PHYSIOGNOMIC CLASSES

- 1a. Trees and shrubs have a total aerial cover greater than 30 percent.
- 2a. Trees are dominant.

GROUP I- FORESTED HABITATS

- 2b. Shrubs are dominant

GROUP II - SHRUB HABITATS

- 1b. Trees and shrubs have a total canopy cover less than 30 percent.
- 3a. Perennial grasses and forbs are dominant, generally with a total canopy cover greater than 60 percent.

GROUP III - HERBACEOUS HABITAT

- 3b. Annual grasses and forbs are dominant, generally with a total canopy cover less than 60 percent; substrate has been exposed by stream erosion.

GROUP IV - STREAMBAR HABITATS

KEY TO RIPARIAN COMMUNITY TYPES (RCTs)

GROUP I - FORESTED HABITATS

- 1a. Populus tremuloides dominant in the overstory.
- 2a. Shrub and/or herbaceous strata dominated by facultative hydrophytes, often including Rosa woodsii, Ribes spp., and Poa pratensis; occurs on floodplains.

POTR/MH RCT

- 2b. Other than above.
(Unclassified Riparian Habitats)
- 1b. Other than above.
(Unclassified Riparian Habitats)

GROUP II - SHRUB HABITATS

- 1a. Salix spp. dominant in the overstory.
- 2a. Herbaceous vegetation covers at least 30 percent of the surface.
- 3a. Smilacina stellata, Poa pratensis, and other mesic forbs are dominant herbaceous species.

SALIX/MH RCT

- 3b. Other than above.
- 4a. Carex and other wet site species are dominant herbaceous species.

SALIX/CAREX Minor RCT

- 4b. Other than above.
(Unclassified Riparian Habitats)

- 2b. Other than above.
- 5a. Surface sediment is sandy.
SALIX/SB Minor RCT

- 5b. Surface sediment is extremely gravelly.
SALIX/GB Minor RCT

- 5c. Surface (or bank) is covered by dead branches.
SALIX/DWM RCT

- 5d. Other than above.
(Unclassified Riparian Habitats)

- 1b. Other than above.
- 6a. Artemisia tridentata dominant in the overstory.

- 7a. Poa pratensis occurs with high constancy in the herbaceous stratum; occurs on floodplains.

ARTR/POPR RCT

- 7b. Other than above.
(Unclassified Riparian Habitats)

- 6b. Other than above.
(Unclassified Riparian Habitats)

GROUP III - HERBACEOUS HABITATS

- 1a. Community dominated by sedges (Carex spp.)

- 2a. Carex nebrascensis is dominant.
CANE RCT

- 2b. Other than above.

- 3a. Carex vesicaria is dominant
CAVE Minor RCT

- 3b. Other than above
(Unclassified Riparian Habitats)

- 1b. Other than above.

- 4a. Juncus balticus is codominant; Poa pratensis is generally present.

JUBA RCT

- 4b. Other than above.

- 5a. Poa pratensis is dominant; Juncus balticus is absent or occurs with less than 10 percent cover.

POPR RCT

- 5b. Other than above.

- 6a. Eleocharis pauciflora is dominant or codominant.
ELPA Minor RCT

- 6b. Other than above.

- 7a. Scirpus microptera is dominant.
SCMI Minor RCT

- 7b. Other than above.

- 8a. Mimulus guttatus present, generally with greater than 20 percent cover; spring areas.

MIGU Minor RCT

- 8b. Other than above.
(Unclassified Riparian Habitats)

GROUP IV - STREAMBAR HABITATS

1a. Herbaceous vegetation covers less than 30 percent of the stream deposited substrate; occurs in stream channel.

2a. Substrate is loamy texture.

SIB RCT

2b. Substrate is sandy texture.

SB RCT

2c. Substrate is extremely gravelly valley-fill.

GB RCT

2d. Substrate is extremely cobbly valley-fill.

CB Minor CT

2e. Other than above.

(Unclassified Streambar Habitat)

1b. Herbaceous vegetation covers greater than 30 percent of the stream deposited substrate; occurs in stream channel.

3a. Substrate is loamy texture.

HSIB RCT

3b. Substrate is sandy texture.

HSB RCT

3c. Substrate is extremely gravelly valley-fill.

HGB RCT

3d. Other than above.

(Unclassified Streambar Habitat)

6.1 Forested Habitats

A single forested RCT (POTR/MH), and two forested upland types (POTR/ARTR and POTR-UP) were identified.

6.1.1 Populus tremuloides/Mesic Herbaceous (POTR/MH) RCT

Distribution: The POTR/MH RCT is common in the heads of watersheds. These communities were identified in the DC study area; fragments of communities with aspen overstory were also noted in the GC and NFC study areas.

Physiography: These communities are common along the upper segments (zone of erosion) of V-shaped (fluvial) canyons. They were identified on narrow floodplains 2 to 4 feet above the elevation of normal streamflow. Boundaries with POTR/ARTR communities on alluvial fans and POTR-UPLAND communities on residual slopes are often diffuse. These communities appear to be a result of encroachment of aspen from upland habitats.

Hydrology: These communities are seasonally flooded. Alluvial aquifers may be absent or depressed below the rooting depth of vegetation, due to channel incision or substrates with low permeability. These communities are commonly transitional to upland habitat.

Floodplains with dead-and-down aspen were noted in the vicinity of the DC study area. These remnants of POTR/MH communities were flooded by beaver, resulting in the death of the aspen. When the beaver dams were destroyed, POPR communities became established on the fresh floodplain sediments.

Soil: The soil described was derived from volcanic parent material (rhyolite), typical of the DC study area. Soils derived from mixed parent materials are expected to be highly contrasting to those described.

Surface horizons are dark-colored silt loam about 10 inches thick. Subsoils are grayish brown, fine-loam in which accumulation of illuvial clay is evident. Sandy loam substrate with angular basalt cobble underlie this soil at a depth of about 20 inches. These soils were loamy-skeletal, Aquic Argiborolls.

Vegetation: Aspen (Populus tremuloides) covers at least 30 percent of the surface. Woods rose (Rosa woodsii) and currant (Ribes spp.) are often present in the shrub stratum. Kentucky bluegrass (Poa pratensis) occurs with high constancy in the herbaceous layer, and is often dominant. Slender wheatgrass (Agropyron trachycaulum), basin wildrye (Elymus cinereus), horsetail (Equisetum spp.), aster (Aster spp.), and yarrow (Achillea millefolium) are also common in the herbaceous layer.

Most plants are facultative hydrophytes common to both riparian and upland habitats.

6.1.2 Upland Forested Communities

Populus tremuloides/Artemisia tridentata. This upland type was identified in the DC study area on alluvial fans. Aspen is dominant in the tree stratum with greater than 30 percent canopy cover. Big sagebrush (Artemisia tridentata) is dominant in the shrub stratum, generally with at least 15 percent cover. The herbaceous stratum is dominated by upland grasses.

Populus tremuloides-upland CT. This community was identified in the DC study area on residual slopes. Aspen forms a relatively open overstory. The shrub stratum includes scattered mountain snowberry, serviceberry and big sagebrush; the herbaceous layer is dominated by cool-site forbs.

6.2 SHRUB HABITATS

Two major shrub RCTs and several minor RCTs were identified. Two upland shrub types were also described.

6.2.1 Salix/mesic herbaceous (SALIX/MH) RCT

Distribution: Communities dominated by mixed willow species have been described throughout the Intermountain Region. In northern Nevada, SALIX/MH communities are most extensive along the middle segments of canyons. In upper segments, forested communities are generally dominant; in lower segments, communities are dominated by Salix exigua.

Padgett (in progress) has described similar communities in Utah. Youngblood et al. (1985) described Salix boothii/Poa pratensis communities in eastern Idaho and western Wyoming. Similar communities were also identified along Big Creek in northern Utah (Platts et al. 1987). SALIX/MH communities were identified in all four LFSAs.

Physiography: SALIX/MH communities occur on channel levees, floodplains, and on undulating surfaces formed by the migration of streams across their floodplains. Surfaces are commonly 2 to 3 feet above the level of normal streamflow.

Hydrology: SALIX/MH communities are seasonally flooded. Groundwater level generally corresponds with the elevation of streamflow; fluctuations in streamflow levels may result in fluctuations in groundwater level. While surfaces are usually dry by mid-summer, substrates are moist, generally within 2 feet of the surface. These communities may serve to attenuate flood discharge to lower stream segments.

Soil: Surface layers are dark colored loam from 4 to over 12 inches thick. Thin strata of dark colored sandy loam stratified between thicker layers of gravelly sandy loam, typically underlie the epipedon. Subsoils are mottled throughout. Textures are generally courser with increasing depth. The lower boundary with fragmental valley-fill is often diffuse. Soils typical of SALIX/MH communities were loamy-skeletal, Aeric Fluvaquents. These soils intergrade to Fluvaquentic Haploborolls and Aquic Ustifluvents.

Vegetation: Booth willow (Salix boothii), Geyers willow (S. geyeriana), Pacific willow (S. lasiandra) and yellow willow (S. lutea) may occur in the same community, with a total cover of at least 30 percent, generally much greater. Woods rose (Rosa woodsii) and currant (Ribes spp.) are often associated. The herbaceous layer under shrub canopies is generally dominated by forbs including stika columbine (Aquilegia formosa), aster (Aster sp.), catchweed bedstraw (Galium aparine), stinging nettle (Urtica dioica), and starwort (Stellaria sp.). In shrub corridors, the herbaceous stratum is generally dominated by grasses and is similar to POPR communities.

6.2.2 Artemisia tridentata/Poa pratensis (ARTR/POPR) RCT

Distribution: This RCT was identified along Big Creek in northern Utah (Platts et al. concurrent study). It is expected that similar communities occur throughout the Intermountain Region. ARTR/POPR communities share affinities of both upland and riparian ecosystems. They are a major streamside community in the NFC, TC, and GC LFSAs.

Physiography: ARTR/POPR communities were identified on floodplains that are 4 to 5 feet above the level of streamflow. POPR communities occur on somewhat lower floodplains and upland sagebrush communities (ARTR-UPLAND) occur on alluvial surfaces. Channel degradation, reducing the frequency of overbank flooding and the elevation of alluvial aquifers, appears to prompt sagebrush to invade floodplains from uplands.

Hydrology: These communities are seldom flooded but are commonly subirrigated at a depth of 2 to 3 feet below the surface early in the growing season. Ground water is 4 to 5 feet below the surface by late summer.

Soil: Typically, the surface horizon is dark colored loam and is 8 to 12 inches thick. Subsoils often include horizons of illuvial clay accumulation (Argillic horizon) or genetically altered layers with well developed structure (Cambic horizon). Stratified layers underlie the genetic horizon. Textures are coarser with increasing depth and the boundaries with fragmental valley-fill at a depth of 4 to 5 feet are often diffuse. These soils are mottled below a depth of about 2 feet. Soils described were loamy and loamy skeletal families of Fluvaquent Haploborolls.

Vegetation: Big sagebrush (Artemisia tridentata) is the dominant shrub with at least 30 percent cover. Woods rose (Rosa woodsii) is often associated with the shrub stratum. The herbaceous stratum commonly includes a broad assortment of mesic grasses and forbs. Kentucky bluegrass (Poa pratensis) occurs with high constancy with cover greater than 10 percent, while other grasses may be codominant. Slender wheatgrass (Agropyron trachycaulum), horsetail (Equisetum spp.), and baltic rush (Juncus balticus) are common.

Communities similar to ARTR/POPR but dominated by mountain snowberry, serviceberry, chokecherry, and currant were also observed in the vicinities of LFSAs. As described for the ARTR/POPR RCT, these communities reflect the invasion of upland shrub species onto the floodplain in response to depression of ground water levels caused by channel degradation.

6.2.3 Minor Shrub Habitats

Salix/Carex (SALIX/CAREX). These minor shrub communities are characterized by a mixed willow overstory and an understory dominated by sedges. They may develop from SALIX/MH communities that become semi-permanently flooded due to alteration of streamflow and alluvial groundwater geometry. Extensive SALIX/CAREX communities were noted in the vicinity of active beaver ponds. Minor areas of SALIX/CAREX RCT were identified along a transition between CANE and SALIX/MH communities in the GC study area.

Salix exigua/mesic herbaceous (SAEX/MH). The overstory of these communities is a dense thicket of sandbar willow (Salix exigua). The herbaceous layer is generally sparse and dominated by facultative hydrophytes. These communities are extensive on coarse-textured, fluvial substrates that are intermittently flooded. They appear to be primary colonizers of streambar habitats. Minor areas of SAEX/MH communities were identified in the TC study area. These habitats are much more extensive along lower segments of watersheds.

Salix/down woody material (SALIX/DWM). These communities form stringers along streambanks 3 to 4 feet above the level of normal streamflow. The overstory stratum consists of decadent willows, often complimented by woods rose and currant. A thicket of dead branches commonly overhang the streambank, deflecting the force of intermittent and seasonal flooding and creating microsites conducive to sedimentation. The total cover by herbaceous plants is typically less than 10 percent. In some cases, depression of ground water levels caused by channel degradation, appears to have caused the shrubs to willows to become decadent. SALIX/DWM communities were identified in the NFC, TC, and DC study areas.

Salix/sand bar (SALIX/SB). These communities occur along stream channels and are characterized by a mixed assemblage of willow species overhanging sand bars, generally with less than 30 percent herbaceous cover.

Salix/gravel bar (SALIX/GB). These communities occur along stream channels and are characterized by a mixed assemblage of willow species overhanging gravel bars, generally with less than 30 percent herbaceous cover.

6.2.4 Upland Shrub Habitats

Artemisia tridentata - upland (ARTR-UPLAND). These communities are prominent streamside communities where alluvial landforms encroach upon the medial axis of the valley, and where streams swing wide turns and glance alluvial slopes. Adjacent to the channel, these communities form unstable banks that are several feet above the floodplain and more than 5 feet above normal streamflow. ARTR-UPLAND communities were identified along the streambanks of TC, GC and NFC study areas.

Amelanchier - upland (AMEL-UPLAND). This community was identified on residual canyon slopes. It occurs as a streamside community in narrow V-canyons and where streams glance canyon slopes. The shrub stratum is dominated by serviceberry (Amelanchier sp.), often complimented by big sagebrush, mountain snowberry (Symphoricarpos oreophilus), rubber rabbitbrush (Chrysothamnus nauseosus), Douglas rabbitbrush (C. viscidiflorus) and woods rose. Where adjacent to streams, these communities form very high and unstable banks. Streamside AMEL-UPLAND communities were identified in the GC study area.

6.3 Herbaceous Riparian Communities

Three major herbaceous and several minor RCTs were identified. The distribution of contrasting communities generally corresponded with differences in water regime.

6.3.1 Poa pratensis (POPR) RCT

Distribution: POPR communities have been described along tributaries of the Snake River in eastern Idaho and western Wyoming (Youngblood et al. 1985), in the Salmon River drainage (Tuhy and Jensen 1983) and along tributaries of the Bear River in northern Utah (Platts et al. concurrent study). It is likely that the distribution and extent of POPR communities has been enhanced through grazing, at the expense of more diverse grass-meadows. POPR communities were identified in all four LFSAs.

Physiography: POPR communities were identified on floodplains that are 2 to 3 feet above the level of normal streamflow and along the foot of slopes that are characterized by ephemeral spring discharge or pronounced surface runoff. On floodplains, the surface is generally smooth to slightly undulating and even; along footslopes, surfaces are broadly convex.

Hydrology: On floodplains, these communities are seasonally flooded. By midsummer, ground water is 2 to 3 feet below the surface, although the substrate is generally moist at 1 to 2 foot depth.

Along footslopes, POPR communities are sustained by surface discharge from uplands and ephemeral spring discharge through subsurface strata. Ground water may be 4 to 5 feet below the surface by mid-summer, though the substrate is generally moist at about 2 foot depth. These communities are subirrigated.

Soil: Surface horizons are dark colored loam and silt loam about 12 to 18 inches thick. Subsoils are characterized by accumulation of illuvial clay (argillic horizon) and grey colors indicative of prolonged wetness. Stratified sediments underlie genetic horizons, generally at a depth of 2 to 3 feet. Fragmental valley-fill underlies these soils at a depth of 3 to 4 feet. The degree of in-situ development characteristic of soils requires a long period of relative stability to develop. Soils described were fine-loamy, Aquic Argiborolls.

Vegetation: Kentucky bluegrass (Poa pratensis) occurs with high constancy and with cover usually greater than 10 percent. Common associated species include baltic rush (Juncus balticus), slender wheatgrass (Agropyron trachycaulum), meadow barley (Hordeum brachyantherum), yarrow (Achillea millefolium), horsetail (Equisetum arvense), field clustered sedge (Carex praeegracilis), longleaf arvense

(Geum macrophyllum), northwest cinquefoil (Potentilla gracilis), aster (Aster spp.) and dandelions (Taraxacum officinale). POPR communities often occur in association with JUBA communities, the latter occupying concave microsites.

6.3.2 Juncus balticus (JUBA) RCT

Distribution: JUBA communities have been identified along tributaries of the Snake River in eastern Idaho and western Wyoming (Youngblood et al. 1985), in the Salmon River watershed of central Idaho (Tuhy and Jensen 1983), and along Big Creek in northern Utah (Platts et al. concurrent study). JUBA communities were identified in the TC and GC study areas.

Physiography: JUBA communities occur in association with POPR communities on floodplains that are 2 to 4 feet above normal streamflow. They were also identified on sandy streambars less than 2 feet above the level of streamflow.

Hydrology: On floodplains, JUBA communities are seasonally flooded; ground water is 2 to 4 feet below the surface by mid-summer. The substrate is generally moist 1 to 2 feet below the surface. On streambars, these communities are intermittently flooded and groundwater is typically within 1 to 2 feet deep although surfaces may be dry due to the low water retention capacity of substrates.

Soil: On floodplains, surface horizons are dark grey, silt loam about 12 inches thick. Well developed argillic horizons subtend the epipedon. Substrata are typically fine-textured, often to 2 to 3 feet depth, and overlie fragmental valley-fill. While surface horizons are often mottled, reflecting fluctuating wetness, fine-grained substrates may be gleyed due to prolonged wetness and limited aeration. Soils identified are fine-loamy, Aquic Argiborolls.

On streambars, surface horizons are typically sandy sediments about 1 foot thick and overlie extremely gravelly substrate. These soils are Aeric Fluvaquents.

Vegetation: Baltic rush (Juncus balticus) is dominant, generally with greater than 25 percent cover. Mesic species characteristic of POPR communities invade the borders while a compliment of more hydrophytic vegetation may harbor in the wettest microsites. Kentucky bluegrass occurs with high constancy, and is often codominant, though less apparent. More hydrophytic indicators include sedges (Carex spp.), horsetail (Equisetum spp.), alkali buttercup (Ranunculus cymbalaria) and mossy surfaces.

6.3.3 Carex nebrascensis (CANE RCT)

Distribution: Widely scattered CANE communities were identified along headwater of the Snake River in eastern Idaho and western Wyoming (Youngblood et al. 1985) and along Big Creek in northern Utah (Platts et al. concurrent study). The species for which this community type is named occurs in wet habitats, often in alkaline situations, from lowlands to moderate elevations throughout the Intermountain Region (Cronquist et al. 1979). CANE communities were identified in DC, TC and GC study areas.

Physiography: CANE communities occur as narrow stringers along protected reaches of stream channel, and associated with seeps and springs along the flanks of the valley. Where adjacent to the stream, they are seldom more than 1 to 2 feet above the level of streamflow. Where associated with seeps, CANE communities are confined to the wettest microsites, which hold water through early summer.

Hydrology: Through early-to-late summer, these communities are saturated at the surface, either from capillary rise of shallow alluvial groundwater, streambank discharge, or springs. Some communities may be semipermanently flooded by shallow groundwater.

Soil: Where CANE communities are along streambanks, the profuse organic matter production is generally apparent in dark colored epipedons. Where the rate of production keeps pace with that of sedimentation, mollic epipedons develop. Where sedimentation is dominant, fresh organic materials may be restricted to a thin layer, probably analogous to the dark bands of stratified subsoils of more mesic types. Sandy substrate is underlain by fragmental valley fill at about the level of streamflow. These soils were classified as Typic and Mollic subgroups of Fluvaquents.

Vegetation: The communities are dense swards of graminoid vegetation. Nebraska sedge (Carex nebrascensis) is dominant with greater than 25 percent cover. Some commonly associated species include Kentucky bluegrass (Poa pratensis), baltic rush (Juncus balticus), alkali buttercup (Ranunculus cymbalaria), and cinquefoil (Potentilla spp.). CANE communities may form as narrow ecotones along the streambank of more mesic community types.

6.3.4 Minor Herbaceous Communities

Eleocharis pauciflora (ELPA) RCT. This minor RCT was identified in spring rivulets draining mine tailings on the eastern flank of the GC study area. Soils are semipermanently flooded to saturated. Soils are characterized by a thin organic epipedon subtended by relatively fine-grained, gleyed sediments with low permeability. The dominant species include fewflowered spikerush (Eleocharis pauciflora), common monkeyflower (Mimulus guttatus), alkali buttercup (Ranunculus cymbalaria) and hairy willowweed (Epilobium ciliatum).

Carex vesicaria (CAVE) RCT. This minor RCT was identified in spring areas of the GC study area and as narrow stringers along low streambanks in the DC study area. These communities are saturated throughout the growing season. In spring areas, soils are typically organic; along streambanks, surface soils are fine-texture with high water retention capacity. These communities are swards dominated by blister sedge (Carex vesicaria); plants commonly associated in the herbaceous strata include beaked spikerush (Eleocharis rostellata), mannagrass (Glyceria sp.), Kentucky bluegrass, hairy willowweed (Epilobium ciliatum), common monkeyflower (Mimulus guttatus) and alkali buttercup (Ranunculus cymbalaria).

Typha latifolia (TYLA) RCT. A single, very small delineation of this minor RCT was delineated in the GC study area. These communities are semipermanently flooded. Cattail (Typha latifolia) is the dominant species.

Scirpus microptera (SCMI) RCT. This minor RCT was described on a streambar that was saturated by a seep emanating from the streambank in the GC study area. Surface horizons are sandy sediments less than 6 inches thick. Subsurface strata are fragmental and gleyed due to prolonged saturation. These communities are dominated by paniced bulrush (Scirpus microptera) complimented by Kentucky bluegrass, bentgrass (Agrostis spp.), alkali buttercup, common monkeyflower, and an assortment of wet site grasses and forbs. Surfaces are mossy. These communities are a wet variant of herbaceous sand bar (HSB) communities.

Mimulus guttatus (MIGU) RCT. This minor RCT was identified in permanently flooded, shallow, spring rivulets in the GC study area. Soils are fine-texture and commonly include thin organic horizons. Communities similar to these were observed in spring rivulets draining across acid mine-tailings. Common monkeyflower (Mimulus guttatus) occurs with high constancy and greater than 10 percent cover. Associated species include common spikerush (Eleocharis pauciflora), Nebraska sedge (Carex nebrascensis), swordleaf rush (Juncus ensifolius), alkali buttercup (Ranunculus cymbalaria) and other wet site, acid tolerant grasses and forbs. Surfaces are mossy.

6.4 Streambar Habitats

Streambar habitats are characterized by substrates similar to that of the stream bottom and normally occur within the confines of the stream channel. Vegetation is generally sparse, or dominated by an assemblage of plants that have encroached from neighboring vegetation types. Areas with less than 30 percent total plant cover were named by the size fraction of the substrate or position relative to channel morphology. Four substrate types were identified in our study areas: (1) Cobble Bar (CB); (2) Gravel Bar (GB); Sand Bar (SB); and (4) Eroded Bank (EB). Streambar habitats with greater than 30 percent total plant cover were named by the size fraction of the substrate, prefixed with the term "herbaceous". Herbaceous gravel bars (HGBs), Herbaceous sand bars (HSBs) were identified in the LFSAs.

6.4.1 Substrate Types

Cobble Bar (CB). This substrate type is commonly associated with high gradient stream reaches and entrenched channels. Intermittently flooded surfaces are typically less than 1 foot above normal streamflow level. The dominant surface sediments are greater than 2 inches diameter, which may be embedded to varying degrees. Total vegetative cover is less than 30 percent.

Gravel Bar (GB). This substrate type is commonly associated with graded segments of streams on intermittently flooded surfaces less than 2 feet above normal stream level. The dominant surface sediments are less than 2 inches diameter, but larger than 2 mm. Total plant cover is less than 30 percent.

Sand Bar (SB). This substrate type is most commonly associated with depositional areas of low gradient streams that are intermittently flooded. Surface sediments are mostly in the soil-size fraction (< 2mm diameter). Grasses are usually dominant, with total vegetative cover less than 30 percent.

Eroded Bank. These are commonly nonvegetated, steep transitions between the floodplain and the stream channel. The characteristics of EB(s) vary with the type of community forming the bank.

6.4.2 Herbaceous Streambar Habitats

Herbaceous Gravel Bar (HGB). These communities are common on point bars that are less than 2 feet above the level of normal streamflow. They are intermittently flooded. Substrates are fragmental, with very high permeability and very low water holding capacity. Total vegetation cover ranges from 30 to 60 percent and is often dominated by Kentucky bluegrass, Louisiana sagewort (Artemisia ludoviciana), hairy willowweed (Epilobium ciliatum), groundsmoke (Gaeophytum sp.), prickly lettuce (Lactuca serriola), nettle (Urtica dioica), and flannel mullen (Verbascum thapsus). Floristically, these are the among the most diverse communities described.

Herbaceous Sand Bar (HSB). These communities are common along the lateral flanks of point bars. Although intermittently flooded, surface sediments may be dry by early summer due to the low water-holding capacity of the loose, sandy substrates. Gravelly substrate underlies SBs, generally at a depth less than 1 foot. Soils generally lack development, other than stratification. Total plant cover ranges from 30 to 60 percent. Facultative and obligate hydrophytes are generally dominant. Carpet bentgrass (Agrostis stolonifera), shortawn foxtail (Alopecurus aequalis), field horsetail (Equisetum arvense), mannagrass (Glyceria sp.), Kentucky bluegrass (Poa pratensis), annual bluegrass (Poa annua), Baltic rush (Juncus balticus), American speedwell Veronica americana, and dandelion (Taraxacum officinale) are among the most frequently noted species.

The loose consistency of these soils makes them easily disturbed by grazing. Elimination of vegetation, which serves to stabilize sand bars, may cause retrogression to gravel bars.

6.5 Miscellaneous Habitat Types

Five miscellaneous habitat types were identified in the LFSAs. Breif descriptions of these types follow.

Down Woody Material (DWM). Woody debris that is common along the flanks of the stream channel.

Water (H2O). Standing water disjunct from the stream channel such as backwashes.

Road. Roadways in the vicinity of the riparian zone.

Rock. Rock or boulders; includes areas of rip-rap fill.

Tailing. Mine tailings; identified in the GC study area.

7.0 INVENTORY OF RIVERINE/RIPARIAN HABITATS

Mapping was conducted on low-elevation CIR aerial photos of approximately 1:2,000 scale. Two types of map units were identified:

Consociations: map units consisting of a single dominant type; inclusions of contrasting types may comprise up to 15 percent of delineations.

Complexes: map units consisting of two or more codominant types that could not be delineated separately; inclusions of contrasting types may comprise up to 15 percent of delineations.

Most map-units are consociations. A complex of communities with aspen overstories was identified in the DC study area. The smallest delineations were less than 0.01 acres.

Inventories of riverine/riparian habitats for DC, TC and GC study areas are presented in Figures 7-1, 7-2, and 7-3, respectively. These maps were reduced about 100 percent from the original mapping scale. Aerial photos were not available for the NFC study area at the time of report preparation.

An approach for summarizing spatial characteristics of LFSAs using Geographical Information Systems (GIS) software is currently under evaluation. It appears that this approach may be useful for measuring the areas of riverine/riparian habitats for discrete valley segments, for measuring the linear extents of channel-forming and bank-forming habitats, for measuring canopy cover over streams, and for assessing spatial relationships between various levels of the classification hierarchy. This approach will be tested in ongoing studies and discussed in subsequent reports.

8.0 DATA SUMMARY

Summaries and preliminary analyses of riparian data are intended to discern the impacts of livestock upon riverine and riparian habitats. The riparian data base will be integrated with the fishery habitat data base that was assembled by colleagues at the Intermountain Research Station (IRS). Analyses of the integrated data base will be used to evaluate the effects of livestock upon aquatic habitat and to refine interpretations of the mechanisms through which these effects are manifest. Results of analyses of the integrated data base will be reported in subsequent documents.

Preliminary observations indicated that perhaps the most apparent impacts of livestock are upon the morphology of stream channels. Livestock may indirectly impact channel morphology through alteration of streamside vegetation that serves to stabilize streambanks. Livestock may also trample streambanks. These impacts to channel morphology may lead to changes in streamflow regime (e.g., velocity, discharge, depth, width, wetted perimeter, etc.), which may further exacerbate impacts upon the stream channel. Changes in streamflow regime also may be reflected in altered alluvial groundwater geometry and corresponding influences to riparian habitats. Impacts resulting in depression of groundwater levels may lead to succession of drier habitats that are less resilient to the forces of erosion, which may lead to further deterioration of both riparian and aquatic habitats. The endpoint of this deterioration may be the replacement of vegetated riparian habitats with nonvegetated streambar habitat.

Given rest, the trend towards more stable conditions are also apparent in the morphology of stream channels. The restoration of stream channels

commonly corresponds with a decline in the extent of eroded banks and replacement of nonvegetated streambar habitat with more persistent vegetated communities. As restoration proceeds, laid-back streambanks tend to encroach towards the medial axis of stream channels, thereby ameliorating the dynamics of streamflow. Alterations corresponding with restoration of stream channels often lead to succession of more hydric streamside habitats that are more resilient to the forces of erosion.

Transect data are the most resolute level of inventory. Riparian habitats and soil types were identified along transects extending from the stream edge to 10 feet beyond the apparent bank (if present) for both sides of the stream channel. Two general types of habitat were identified:

Channel-forming types: occur within the confines of the stream channel and are flooded by moderate-to-high stream discharge; characterized by substrate similar to that of the stream bottom (e.g. sand and gravel).

Bank-forming types: occur on the floodplain and are flooded by overbank discharge; characterized by sediments dissimilar to that of the stream bottom (i.e., soil).

The average widths of channel-forming types for bank-forming communities, grazed versus rested treatments, are summarized in Tables 8-1 through 8-4.

For a given LFSA the extent of channel-forming communities is thought to be a function of several variables. The total width of channel-forming habitats is expected to vary between **convex banks** (point bars), **concave banks** (opposite), and straight segments of channel. The bank-forming type may also influence the extent of channel-forming habitats. Treatments (i.e., grazed versus rested) may have also influenced the extent of channel-forming types, through destabilization of streambanks. From a broader perspective, the extent of channel-forming types may also vary between LFSAs as a function of geomorphic parameters. Preliminary statis-

Figure 7-1.

INVENTORY OF RIVERINE/RIPARIAN HABITAT TYPES
Deer Creek
Livestock/Fishery Study Area

LEGEND

STREAMBAR HABITAT

Silt Bar (SB)

HERBACEOUS HABITAT

Poa Pratensis (POPR)

SHRUB HABITAT

Salix/Mesic Herbaceous (Salx/MH)

340 Artemisia Tridentata/Poa Pratensis (ARTR/POPR)

UPLAND HABITAT

360 Artemisia Tridentata-Upland (ARTR/UP)

FOREST HABITAT

Populus Tremuloides Complex (POTR/MH XPOTR-UP)

Populus Tremuloides/Mixed Herbaceous (POTR/MH)

Populus Tremuloides/Artemisia Tridentata (POTR/ARTR)

0 500 1000 Feet

Transects

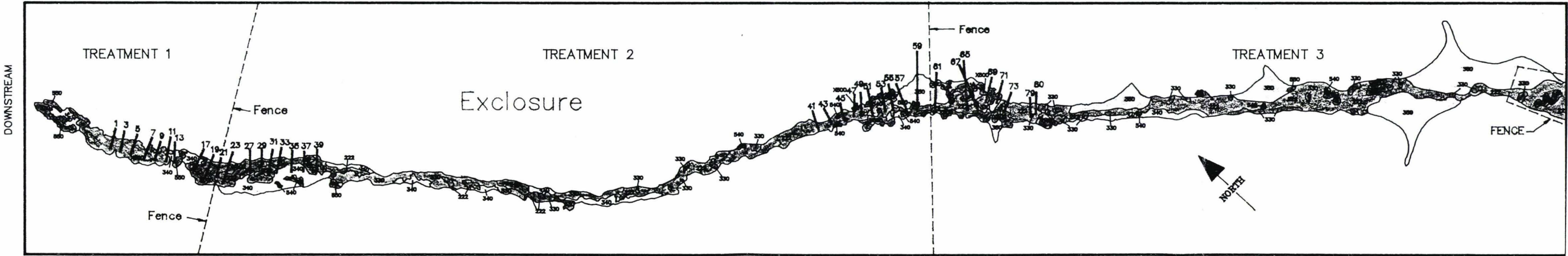


Figure 7-2.

INVENTORY OF RIVERINE/RIPARIAN HABITAT TYPES

Tabor Creek

Livestock/Fisheries Study Area

UPSTREAM

LEGEND

STREAMBAR HABITAT

- 120 Gravel Bar (GB)
- 125 Herbaceous Gravel Bar (HGB)

HERBACEOUS HABITAT

- 211 Carex Nebrascensis (CANE)
- 221 Juncus Balticus (JUBA)
- 222 Poa Pratensis (POPR)

SHRUB HABITAT

- 312 Salix/Gravel Bar (SALIX/GB)
- 330 Salix/Medic Herbaceous (SALIX/MH)
- 340 Artemisia Tridentata/Poa Pratensis (ARTR/PR)

UPLAND HABITAT

- 350 Artemisia Tridentata-Upland (ARTR-UP)

MISCELLANEOUS HABITAT

- 197 Stream (aquatic)
- 199 Road

TRANSECTS

NORTH

APPROXIMATE SCALE

0 500 1000 Feet

DOWNSTREAM

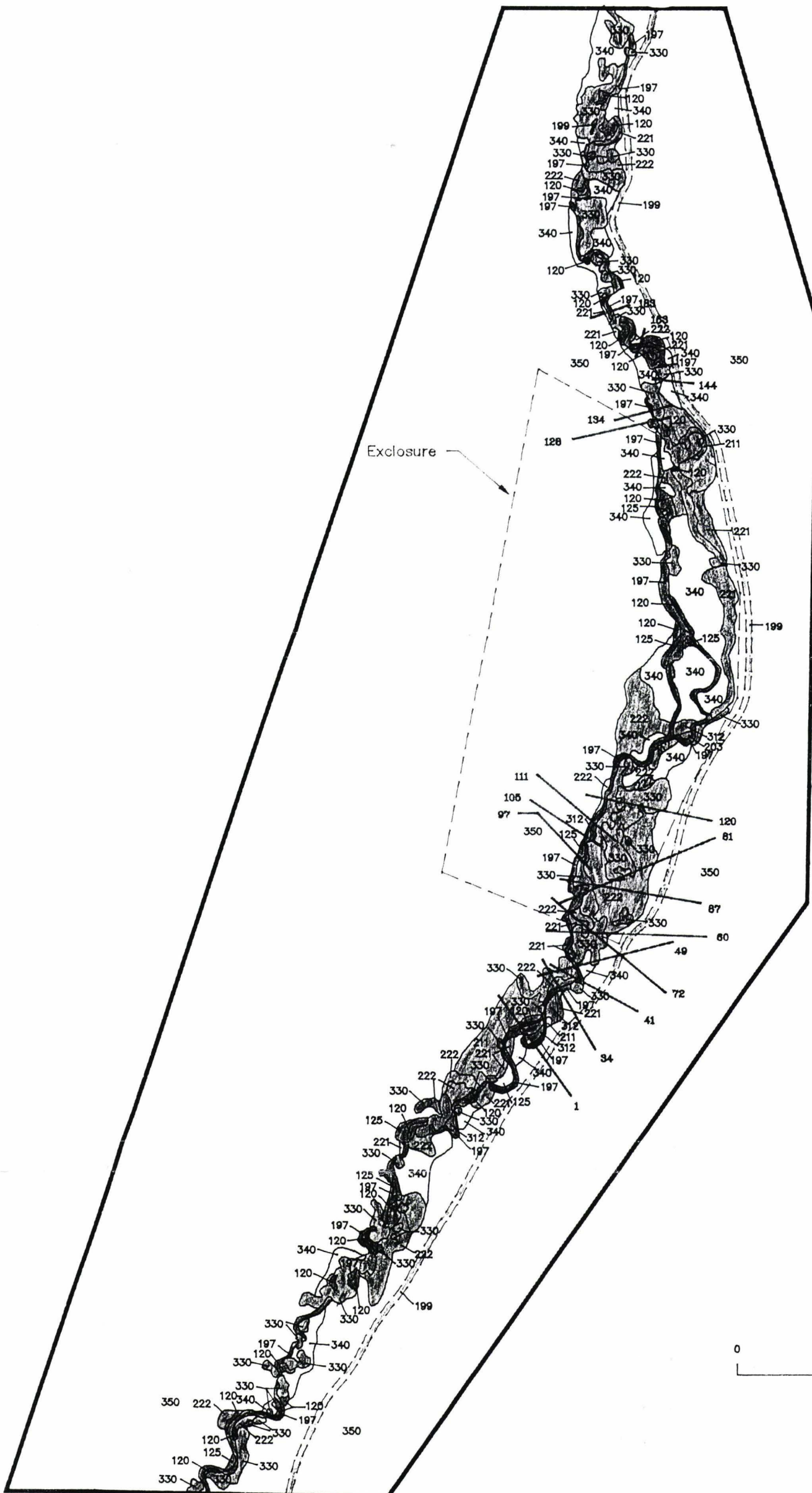


Figure 7-3.

INVENTORY OF RIVERINE/RIPARIAN HABITAT TYPES

Gance Creek

Livestock/Fishery Study Area

LEGEND

STREAMBAR HABITAT

210 Gravel Bar (GB)

HERBACEOUS HABITAT

212 Eleocharis Pauciflora (ELPA)

214 Carex Vesicaria (CAVE)

215 Typha Latifolia (TYLA)

222 Poa Pratensis (POPR)

223 Disturbed

SHRUB HABITAT

330 Salix/Mesic Herbaceous

340 Artemisia Tridentata/Poa Pratensis (ARTR/POPR)

FORESTED HABITAT

340 Populus Tremuloides/Mesic Herbaceous (POTR/MH)

MISCELLANEOUS HABITAT TYPES

195 Mine Tailings

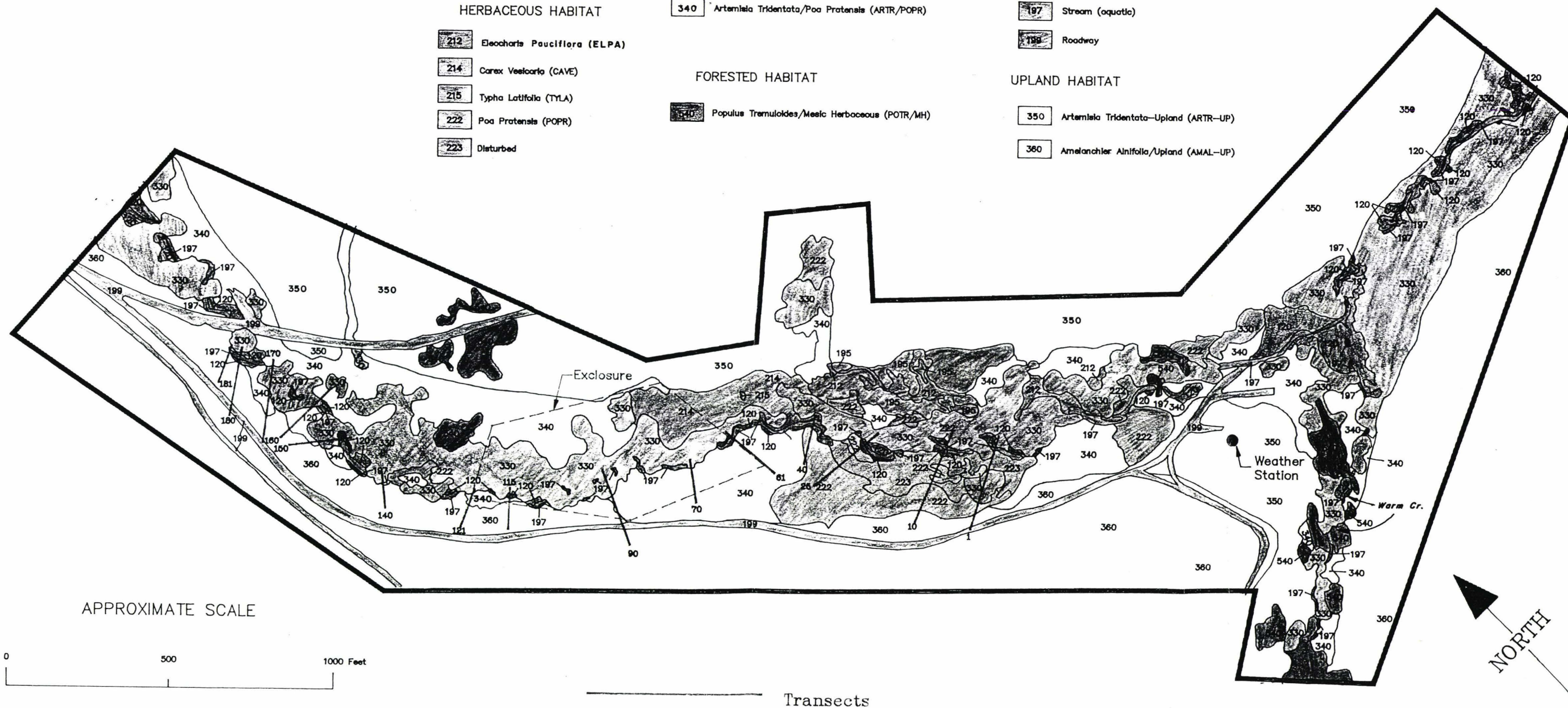
197 Stream (aquatic)

199 Roadway

UPLAND HABITAT

350 Artemisia Tridentata-Upland (ARTR-UP)

360 Amelanchier Alnifolia/Upland (AMAL-UP)



tical analyses were conducted to evaluate the relationship between the extents of channel-forming habitats and some of these variables.

Table 8-1. Average width of channel-forming communities for bank-forming types, grazed versus rested, Deer Creek study area.

BANK TYPE:	CAVE		JUBA		POPR		SALIX/MH		ARTR/POPR		ARTR-UP		POTR/MH		POTR/ARTR	
TREATMENT:	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST
OBSERVATIONS:	12	18	0	1	25	25	1	1	0	4	1	1	19	30	21	0
<u>CHANNEL TYPE</u>																
GB	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
EB	.0	.0	.0	.0	1.7	.0	.0	.0	.0	.0	5.0	.0	1.5	.0	.4	.0
CAVE	.0	.0	.0	.0	.3	.2	4.0	.0	.0	.3	.0	.0	.0	.1	.4	.0
POPR	.0	.0	.0	.0	.0	.5	.0	.0	.0	2.5	.0	.0	.2	.7	.1	.0
TOTAL	.0	.0	.0	.0	2.0	.8	4.0	.0	.0	2.8	5.0	.0	1.7	.8	1.0	.0

Table 8-2. Average widths of channel-forming types for bank forming communities, grazed versus rested, North Fork Cottonwood study area.

BANK TYPE:	POPR		SALIX/DWM		SALIX/GB		SALIX/MH		ARTR/POPR		ARTR-UP	
TREATMENT:	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST
OBSERVATIONS:	16	14	4	0	2	0	35	19	0	4	18	34
<u>CHANNEL-TYPE</u>												
SIB	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0
SB	.0	1.2	.0	.0	.0	.0	.5	.1	.0	.0	.2	.6
GB	3.8	2.9	.0	.0	.0	.0	.7	13.5	.0	.0	4.1	10.6
EB	2.1	.1	.0	.0	3.0	.0	3.3	.1	.0	.0	3.2	2.7
POPR	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0
SALIX/DWM	.0	.0	.0	.0	.0	.0	.1	.3	.0	.0	.0	.0
SALIX/SB	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.3
SALIX/GB	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.4	.0
SALIX/MH	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0
TOTAL	5.9	4.3	.0	.0	3.0	.0	5.0	14.7	.0	.0	8.6	14.2

Table 8-3. Average widths of channel-forming types for bank forming communities, grazed versus rested, Tabor Creek study area.

BANK TYPE:	CANE		JUBA		POPR		SALIX/DWM		SALIX/GB		SALIX/MH		ARTR/POPR		ARTR-UP	
TREATMENT:	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST
OBSERVATIONS:	12	0	41	14	33	46	31	15	1	3	24	10	40	10	31	16
CHANNEL-TYPE																
SB	.0	.0	.0	.0	.1	.2	.0	.0	.0	.0	.0	.0	.0	.3	.1	.0
GB	.0	.0	.0	1.8	.6	.6	1.1	.3	.0	1.7	1.8	.5	.2	.3	.3	.9
CB	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
EB	.0	.0	.0	.0	.2	.2	.0	.0	.0	.0	.3	.6	1.0	.4	2.8	.8
HSB	.0	.0	.0	.0	.0	.0	.0	.0	.0	2.0	.0	.0	.0	.0	.1	1.6
HGB	.0	.0	.6	.0	.7	.2	.0	.0	.0	.0	.7	.0	.5	10.4	1.2	.0
CANE	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.1	.0	.0	.3
JUBA	.0	.0	.0	.0	.0	.1	.5	.0	15.0	.0	.8	.0	.6	.0	.0	.0
SALIX/DWM	.0	.0	.1	.0	.1	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
SALIX/SB	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.3	.0	.3	.0	.0	.0
SALIX/GB	.0	.0	1.0	.0	.0	.4	.1	.0	.0	2.3	.2	.0	.9	.0	.0	.0
SALIX/MH	.0	.0	.0	.0	1.7	.0	.0	.0	.0	.0	.0	.0	.7	.0	.0	3.8
TOTAL	.0	.0	2.0	1.8	3.4	1.6	1.7	.3	15.0	6.0	4.3	1.6	4.3	11.4	4.6	7.3

Table 8-4. Average widths of channel-forming types for bank forming communities, grazed versus rested, Gance Creek study area.

BANK TYPE:	POPR		MIGU		SALIX/DWM		SALIX/CX		SALIX/MH		ARTR/POPR		AMEL-UP	
TREATMENT:	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST	GR	REST
OBSERVATIONS:	49	8	2	1	9	2	9	7	99	69	41	19	24	14
CHANNEL TYPE														
SB	.0	.0	.0	.0	.0	.0	.0	.0	.2	.3	.1	.0	.0	.0
GB	3.0	.4	5.0	.0	.0	.0	7.2	.9	1.1	.5	.6	.0	.7	.1
EB	.6	1.6	.0	.0	.0	.0	.0	.0	.5	.8	1.5	1.6	5.5	3.6
HSB	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
HGB	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
POPR	.3	.0	.0	.0	.0	.0	.0	.0	.0	.1	.3	.0	.0	.0
MIGU	.6	.5	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0	.0	.0
SALIX/DWM	.1	.0	.0	.0	.0	.0	.3	.0	.3	.2	.6	.0	.4	.0
SALIX/SB	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
SALIX/GB	.0	.0	.0	.0	.0	.0	3.7	.0	.1	.4	.0	.0	.0	.0
SALIX/MH	.4	.0	.0	.0	.0	.0	.0	.0	.3	.0	.2	.0	.0	.3
TOTAL	5.0	2.5	5.0	.0	.0	.0	11.2	.9	3.2	2.2	3.4	1.6	6.5	4.0

8.1 Preliminary Statistical Analyses

Statistical analyses were performed to test hypotheses of differences in the extents of channel-forming communities as a function of several variables. One-way and two-way analysis of variance (AOV) and t-tests were used as appropriate. For AOV tests, data were transformed using the $\ln(x+1)$ transform as the cell means and associated variances were highly correlated. Transformations were not made for t-tests as this test is much more robust to differences in variances between populations.

To obtain equal cell sample sizes for two-way AOV, data within each cell were randomly subsampled to produce samples the size of the cell with the least data. Fisher's least significant differences (LSD) were calculated to test for pairwise differences within blocks or treatments when AOV tests were significant ($p < .05$).

Results of preliminary statistical analyses were performed to test for differences in the width of channel-forming types between LFSAs, sides of the river (left versus right banks), bank-forming community, and treatment (grazed versus rested). Results are subsequently presented and discussed.

8.1.1 Differences between LFSAs

Differences in the average extent of channel-forming types between the four study sites were evaluated by testing the following null hypothesis:

The average width of channel-forming types is the same for all four LFSAs.

A two-way AOV was used to test this blocking across sites and with treatments of grazed and rested (see Table 8-5). Results indicate a significant difference between sites ($p < .001$). Tests of LSD's indicate that all sites except Gance and Tabor are different from each other. The average extents of channel-forming types in Gance and Tabor study areas are not significantly

Table 8-5. Two-way AOV of the average extents of channel-forming types between LFSAs, grazed versus rested treatments (n = 71 for each treatment of each LFSA).

SOURCE	DF	SS	MS	F	P
Site	3	134.73	44.91	48.34	P<.001
Treatment	1	0.02	0.02	0.02	n.s
Interaction	3	13.77	4.59	4.94	P<.05
Error	560	520.26	.93		
Total	567	668.78			

different. The average extents of channel-forming types are summarized in Table 8-6.

Table 8-6. Average extent of channel-forming communities for each LFSA.

LFSA	N	AVERAGE WIDTH* CHANNEL-FORMING TYPES (FEET)
Deer Creek	142	1.1a
North Fork Cottonwood	142	8.9c
Tabor Creek	142	3.3b
Gance Creek	142	3.2b

* average widths followed by the same letter are not significantly different (p < .05).

Results of this preliminary analyses support the hypotheses that the extents of channel-forming types are different for sites of contrasting geologic and geomorphic character. The GC and TC study areas are located in areas of similar geologic and geomorphic character (depositional segments of fluvial canyons). The significant interaction of LFSA and treatment may reflect different effects of grazing, the length of time sites have been rested, or differences in the intensity of treatments.

8.1.2 Differences Between Left and Right Banks

The extent of channel-forming types is expected to differ between convex, concave and straight banks. The distribution of these sites, however, should be random with respect to the side (left versus right) of the river. To evaluate this the following null hypothesis was tested:

Ho: The average width of channel forming types is the same for left and right banks of each LFSA.

T-tests were conducted for each LFSA between the average width of channel-forming types on the left and right banks. All sites showed no significant differences between sides of the river ($p > .05$).

Bank conformation (i.e., convex, concave and straight) for channel transects were not identified. These data will need to be collected to test hypotheses concerning the extent of channel-forming types for discrete bank conformations. It is expected that these tests would be very useful for reducing the random variance associated with bank-forming types and treatments.

8.1.3 Differences between Bank-Forming Types

Different bank-forming types may result in different average widths of channel-forming communities. This was evaluated by testing the following hypothesis:

Ho: The average width of channel-forming types is the same for different bank-forming types for each LFSA.

For each LFSA, one-way AOV was conducted for bank-forming types that were identified on at least 5 transects. Separate AOVs were conducted for grazed and rested treatments. Significant differences between at least two bank-forming types were found for all tests except grazed sites on Deer Creek and rested sites on Gance Creek (see Table 8-7). For all LFSAs there

Table 8-7. Mean width of channel-forming types for various bank-forming communities (results of F-tests).

LFSA		
TREATMENT		MEAN WIDTH*
BANK-FORMING TYPE	N	CHANNEL-FORMING TYPE (FEET)
Deer Creek		
GRAZED (P > .05)		
CAVE	12	0.0a
POPR	25	2.0a
POTR/MH	19	1.7a
POTR/ARTR	21	1.0a
RESTED (P < .05)		
CAVE	18	0.0a
POPR	25	0.8b
POTR/MH	30	0.8b
North Fork Cottonwood		
Grazed (P < .05)		
POPR	16	5.9a
SALIX/MH	35	5.0a
ARTR-UP	18	8.6b
Rested (P < .001)		
POPR	14	4.3a
SALIX/MH	19	14.7b
ARTR-UP	34	14.2b
Tabor Creek		
Grazed (P < .001)		
CANE	12	0.0a
JUBA	41	2.0ab
POPR	33	3.4bc
SALIX/DWM	31	1.7a
SALIX/MH	24	4.3cd
ARTR/POPR	40	5.2d
ARTR-UP	31	5.0d
Rested (P < .001)		
JUBA	14	1.8a
POPR	46	1.6a
SALIX/DWM	15	0.3a
SALIX/MH	10	1.6a
ARTR/POPR	10	12.2b
ARTR-UP	16	7.3b

Table 8-7. (Continued)

LFSA			
TREATMENT			MEAN WIDTH*
BANK-FORMING TYPE	N	CHANNEL-FORMING TYPE	(FEET)
Gance Creek			
Grazed (P < .001)			
POPR	49		5.0c
SALIX/DWM	9		0.0a
SALIX/MH	99		3.2b
ARTR/POPR	41		3.4bc
AMEL-UP	24		6.5a
Rested (P > .05)			
POPR	8		2.5a
SALIX/MH	69		2.2a
ARTR/POPR	19		1.6a
AMEL-UP	14		4.0a

* Mean widths for a given LFSA and treatment followed by a same letter are not significantly different.

is a general trend toward greater average width of channel-forming types from the wettest bank-forming communities to the driest.

8.1.4 Differences between Treatments

Differences in the mean width of channel-forming types between grazed and rested treatments were evaluated. The following hypothesis was tested, first for all LFSAs, and then for individual LFSAs.

Ho: The average width of channel-forming types is the same for grazed and rested treatments.

The two-way AOV conducted to test for differences between sites was used to test this hypothesis (see Table 8-5). This test indicated no significant difference between the grazed and rested treatments. Because of the significant interaction between site and treatment, t-tests were conducted between the mean width of channel-forming types for the treatments of each site (see Table 8-8).

Table 8-8. Mean width of channel-forming types for grazed and rested treatments for each LFSA.

Livestock/Fishery Study Area Treatment	N	Mean Width* Channel-forming Types (Feet)	Standard Error
Deer Creek (T = 1.97; P = 0.051)			
Grazed	79	1.4a	0.3
Rested	80	0.7a	0.2
North Fork Cottonwood (T = 3.79; P = 0.0002)			
Grazed	78	5.8a	0.7
Rested	71	11.6b	1.4
Tabor Creek (T = 0.16; P = 0.87)			
Grazed	214	3.4a	0.4
Rested	114	3.3a	0.6
Gance Creek (T = 4.71; P = 0.0000)			
Grazed	234	4.1b	0.3
Rested	121	2.2a	0.3

* Mean widths for a given LFSA followed by a same letter are not significantly different.

The results of these tests indicate no significant difference between grazed and rested treatments for Deer and Tabor LFSAs. The rested treatment was significantly higher for North Fork Cottonwood while the grazed treatment was significantly higher for Gance Creek. It is probable that the failure to identify significant differences was due to differences inherent to grazed versus rested pastures (e.g., extents of bank-forming communities). An extensive streambar that was greater than 50 feet wide occurred in the rested pasture of the NFC study area.

Comparisons of the mean width of channel-forming types between treatments for specific bank-forming types were not conducted due to insufficient sample sizes. The summaries in Tables 8-1 through 8-4 contain the mean widths for each bank-forming type. The trend toward increased mean width of

channel-forming types for dryer bank-forming communities is consistent between grazed and rested treatments (see Table 8-7).

8.2 Discussion

Preliminary statistical analyses were used to identify differences in the total width of channel-forming types between LFSAs, some bank-forming types, and treatments for some LFSAs. These results may be refined by looking at the extent of discrete channel-forming types (e.g., gravelbars, eroded banks, etc.) as affected by LFSAs and grazing treatment.

The extents of streambar types for grazed versus rested treatments of the DC, NFC, TC and GC study areas are illustrated in Figures 8-1 through 8-4. For rested treatments, the general trend is a decrease in the extents of gravel bars (GBs) and eroded banks (EBs), and an increase in the extent of herbaceous gravel bars (HGBs), sandbars (SBs) and herbaceous sandbars (HSBs), relative to grazed treatment areas. Contradictions to this trend are thought to be the result of heterogeneity in the bank-forming types between treatments and differences that existed before the sites were established. It appears that a comparison of streambar types may be useful not only for evaluating the condition of RRHs, but also for projecting the trend.

The extent of streambar types for two LFSA located along Big Creek in northern Utah are illustrated in Figures 8-5 and 8-6. Relationships similar to those described for the Nevada study areas are apparent for the Upper Big Creek study area (Figure 8-5) that has been exclosed for about 5 years. In the Lower Big Creek study area, exclosed for over 20 years, the stream channel has completely recovered. Channel-forming types have been replaced by stable-bank forming types. Comparison between sites of similar

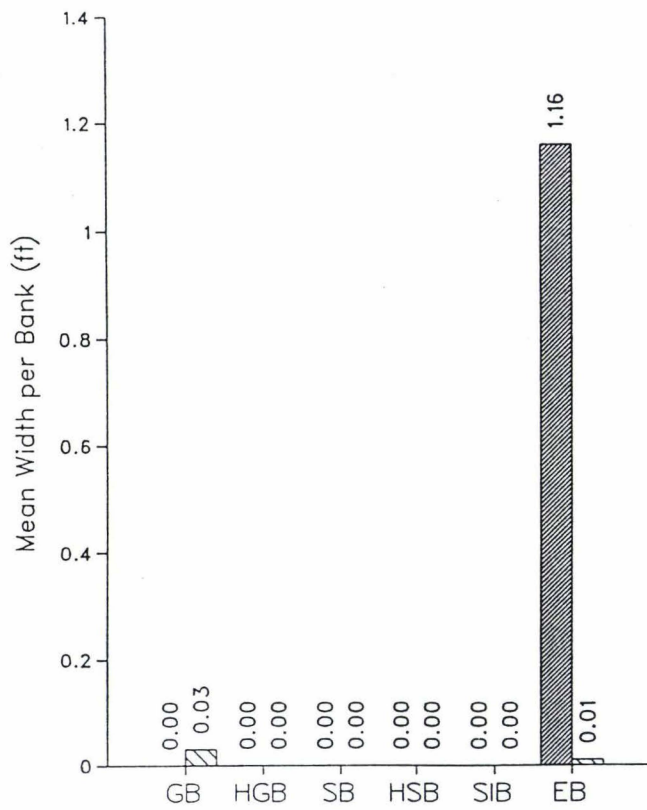


Figure 8-1. Deer Creek

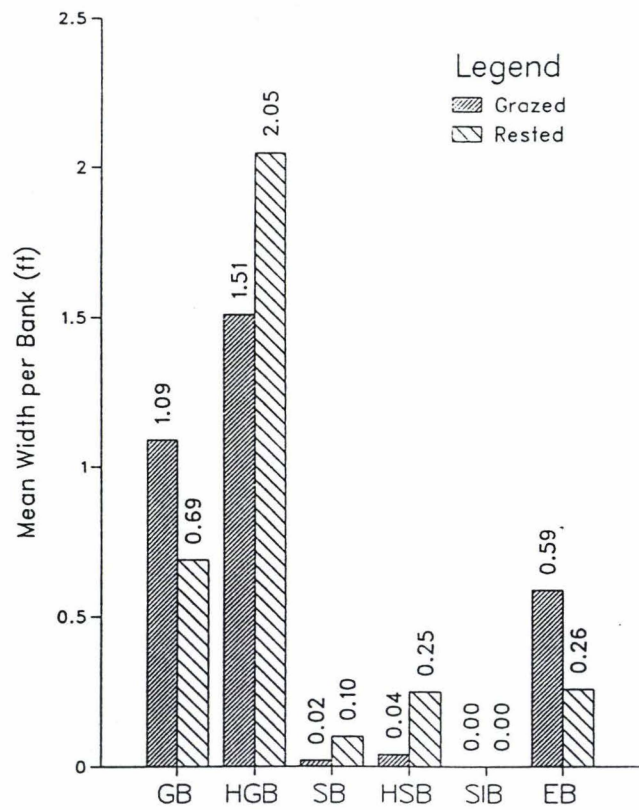


Figure 8-2. Tabor Creek

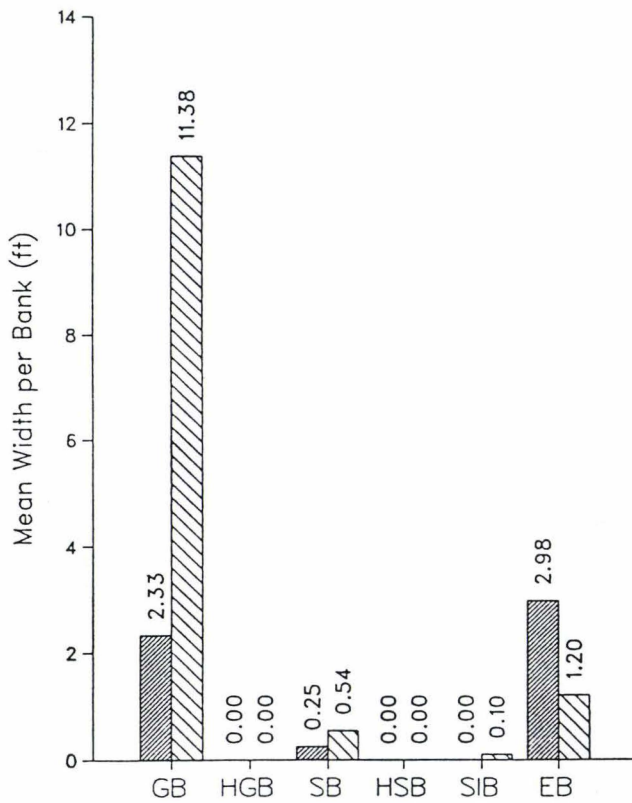


**Figure 8-3.
North Fork Cottonwood Creek**

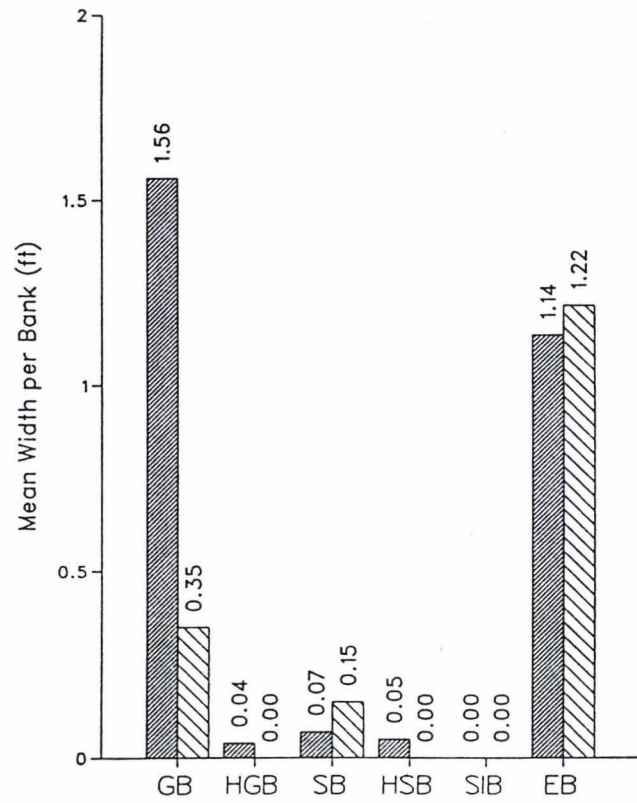


Figure 8-4. Gance Creek

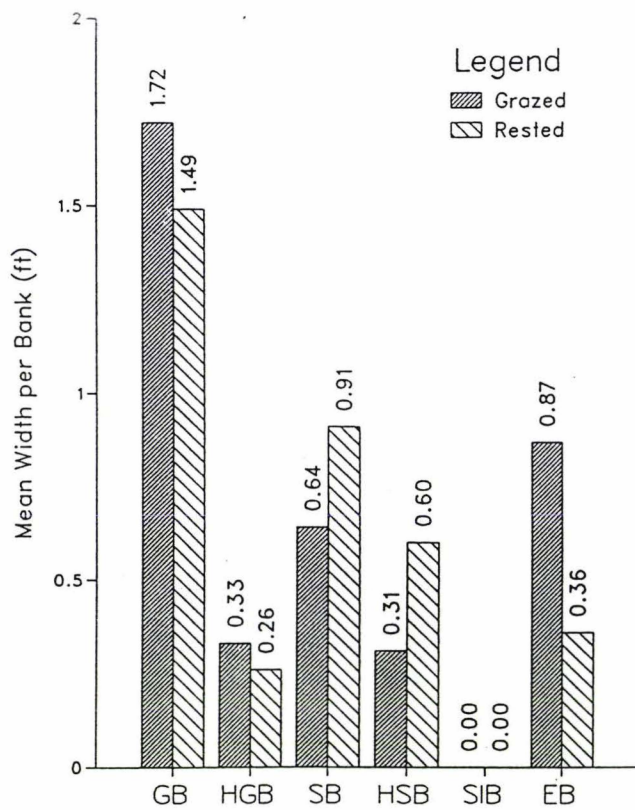


Figure 8-5. Upper Big Creek

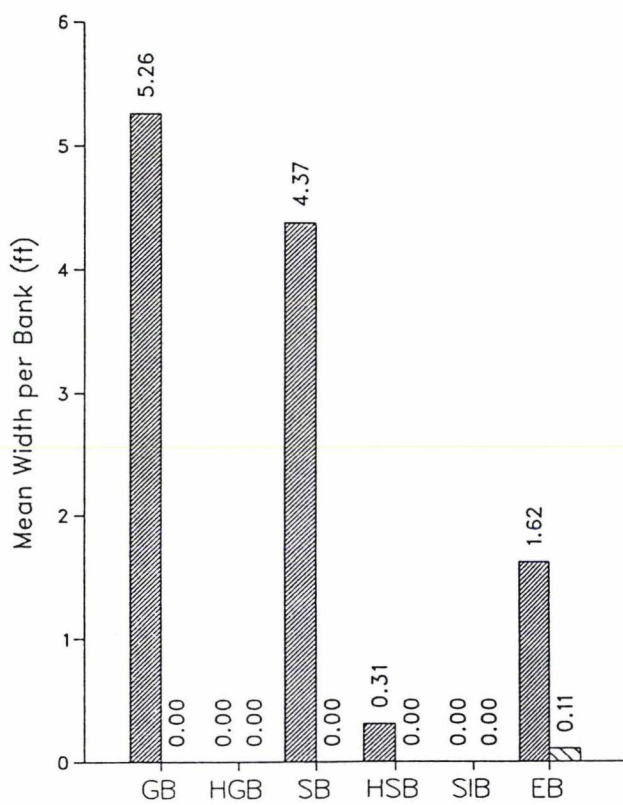


Figure 8-6. Lower Big Creek

geologic and geomorphic character that have been rested for different lengths of time could be useful for estimating the length of time required for restoration of impacted stream channels.

The patterns in these six histograms suggest possible differences between the width of the six channel-forming types between the sites and between treatments. The mean widths from the histograms were used in a three-way AOV to test for differences between LFSAs, channel-forming types and treatment. This analysis was also used to test for interactions between pairs of these three factors. Significant differences in the widths of channel-forming types were found between LFSAs ($p=0.026$) and between channel-forming types ($p=0.000$). Significant interactions were found for LFSAs and channel-forming types ($p=0.032$). No significant differences were found between the treatments ($p=0.0826$) or for the interaction of channel-forming types and treatments ($p=0.434$).

The significant differences found between LFSAs is consistent with results of the previous analysis (section 8.1.1). For channel-forming types, eroded banks and gravel bars were found to be significantly wider than all the other channel-forming types.

The significant interaction between LFSAs and channel-forming types may reflect the interaction of grazing practices and channel-forming types. If grazing history is affecting the width and frequency of channel-forming types, then different grazing intensities between LFSAs could result in this significant interaction. Similarly, different geomorphic types may respond differently to grazing. With three geomorphic types represented by the six LFSAs, a significant interaction could also result from such relationships.

The interaction between LFSAs and treatment (grazed versus rested) was also significant. This interaction may reflect the differences in grazing practices in the control and treatment sites. Treatment sites have been subject to different grazing intensities while the length of rest in the control site varies between LFSAs. Thus, a significant interaction could result if grazing practices were affecting the width and frequency of channel-forming types. Geomorphic types could also respond differently to grazing and rested treatments and result in a significant interaction.

No significant interaction was found between channel-forming types and treatment. This may indicate no relationship between the width of specific channel-forming types and the treatments, contrary to the patterns identified in the histograms. Also, the other significant interactions may be affecting significance of this interaction.

The significant interactions between LFSAs and channel-forming types, and LFSAs and treatments reveal that the extent of channel-forming types is not simply a function of grazing or no-grazing treatments. Rather it is a more complex issue that may involve geomorphology, intensity of grazing, and period of rest after grazing. Additional studies should be designed to address each of these factors and their resulting effect on the width and frequency of channel-forming types. These studies may involve a further analysis of data already collected and the collection of new information from carefully designed programs with the objective of addressing these concerns.

9.0 RECOMMENDATIONS

Recommendations to refine interpretations for enhancing management of riverine/riparian ecosystems in northern Nevada to protect their inherent values are:

1. Integrate the data base described in this document with that collected by colleagues at the Intermountain Research Station; evaluate potential parameters for assessing condition and trend; and conduct analyses using the combined data base to evaluate relationships important to management and the values of these ecosystems.
2. Collect information on bank conformation (e.g., convex, concave, or straight banks) for LFSA transects. This data is expected to explain some of the variability observed within LFSAs for bank-forming types and treatments.
3. A more comprehensive classification of riparian community types is being conducted for U.S. Forest Service lands in northern Nevada (Padgett et al. in preparation). This work should be evaluated for use in subsequent studies.
4. The preliminary statistical analyses were used to identify preliminary relationships and to formulate new questions. These questions, stated as hypotheses in the context of the project objectives, should be used to direct new research efforts. This will likely entail further analyses of both new and existing data. Balanced study designs to specifically address these hypotheses should be developed.
5. Develop relationships that will enable extrapolation of information developed in LFSAs to the perspective of watersheds. This is expected to entail inventory of geologic units, geomorphic types, water regimes, physiognomic types and riparian communities for typical watersheds and analyses of the variance inherent to each of these classes. (This work is ongoing.)
6. It is quite possible that control areas for assessing impacts of grazing are significantly impacted by land uses within their watersheds. Larger control sites (preferably watersheds) need to be identified that are not impacted by grazing or other land use. This will be used to improve the assessment of effects of grazing and recovery trends.

10.0 LITERATURE CITED

- Brunsfeld, S.J. and F.D. Johnson. 1985. Field guide to willows of east-central Idaho. Forest, Wildlife and Range Experiment Station. University of Idaho, Moscow, ID. 95 pp.
- Cowardin, L.H., Carter, V. and E.T. Laroe. 1979. Classification of wetlands and deepwater habitats of the United States. USDI Fish and Wildlife Service. FWS/OBS-79/31. U.S. Govern. Printing Office. Washington DC. 101 pp.
- Cronquist A., Holmgren, A.H., Holmgren, N.H., Reveal, J.L. and P.K. Holmgren. 1977. Intermountain Flora. Volume 6. Columbia University Press. New York. 584 pp.
- Fenneman, N.M. 1931. Physiography of Western United States. McGraw-Hill Book Co., Inc. New York and London. 534 pp.
- Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. Univ. of Washington Press. Seattle and London. 730 pp.
- Norton, B.E., Tuhy, J.S. and S.E. Jensen. 1981. Riparian community classification for the Greys River, Wyoming. Unpublished report to U.S. Forest Service. Ogden, Utah. 184 pp.
- Platts, W.F. and R.L. Nelson. 1983. Livestock-fishery interaction studies, Tabor Creek, Nevada. Progress report 4 to USDI BLM, Nevada State Office, Reno, Nevada. 73 pp.
- Platts, W.F. and R.L. Nelson. 1985. Stream habitat and fisheries response to livestock grazing and instream improvement structures: Big Creek, Utah. Journal Soil and Water Conservation 40(4): 374-378.
- Platts, W.F., S. Jensen, and F. Smith. 1986. Preliminary classification and inventory of riverine/riparian habitats, Big Creek Livestock Fisheries study areas, Utah. USDA Forest Service, Intermountain Research Station, Boise, Idaho. 125pp.
- Tuhy, J.S. and S.E. Jensen. 1982. Riparian classification for the upper Salmon/Middle Fork Salmon River, Idaho. Unpublished report to U.S. Forest Service. Ogden, Utah. 194 pp.
- USDA-SCS. 1975. Soil Taxonomy - a basic system of soil classification for making and interpreting soil surveys. Handbook No. 436. US Govern. Printing Office. Washington DC. 754 pp.
- USDA-SCS. 1978. List of scientific and common plant names for Utah. 132 pp.
- USDA-SCS. 1982. Rich county soil survey. U.S. Government Printing Office, Washington D.C.

- USGS. 1970. Surface water supply of the United States - Snake River Basin. Water Supply Paper 2134. U.S. Government Printing Office, Washington D.C.
- USGS. 1970. Surface water supply of the United States - Snake River Basin. Water Supply Paper 2127. U.S. Government Printing Office, Washington D.C.
- Welsh, S.L., Atwood, N.D., Higgins, L.C. and S. Goodrich. 1987. A Utah Flora. Brigham Young University Press. Provo, Utah. 894 pp.
- Wendt, G.E., Thompson, R.A. and K.N. Larson. 1975. Land systems inventory, Boise National Forest, Idaho. USDA Forest Service. Intermountain Region. 54 pp.
- Youngblood, A.P., Padgett, W.G. and A.H. Winward. 1985. Riparian community type classification of eastern Idaho - western Wyoming. USDA Forest Service R4-Ecol-85-01. 78 pp.

CHANNEL TRANSECT FORM

Date: 7/9/86

Site: LBC

Page: 1/32

LEGEND

Symbol	Community Type	Symbol	Soil Type
ARTR-UP	ARTEMISIA TRIDENTATA - UPLAND	1	UPLAND (FAJOS)
ARTR/BPR	ARTEMISIA TRIDENTATA / POA PRATENSIS	2	AQUIC HARPOXEROLL (MESIC)
BPR	POA PRATENSIS	3	AQUIC ARGIBOROLL
MH	MESIC HERBACEOUS	4	DISTURBED
JUBA	JUNCUS BALTICUS	5	AQUIC ARGIBOROLL (AQUIC)
AGST	AGROSTIS STOLONIFERA	6	SANDY, AERIC FLUVAQUENT
CAVE	CAREX NEBRASCENSIS	7	FLUVAQUENTIC HARPAQUOLL
CARO	CAREX ROSTRATA	8	FLUVAQUENTIC HARPAQUOLL (WET)
EUPA	ELEOCHARIS PALUSTRIS	9	LOAMY, AERIC FLUVAQUENT
SB	SAND BAR	10	SANDY, AERIC FLUVAQUENT
GB	GRAVEL BAR	11	FRAGMENTAL AERIC FLUVAQUENT

Transect	Distance to Stream [1]		Distance to Bank [2]		Left Bank			Right Bank		
	to Stream		to Bank		Dist. [2]	CT	ST	Dist. [2]	CT	ST
	L	R	L	R						
1			8	0	5	SB	T	10+	BPR*	Z
LEFT*: CHANNEL DEGRADED ARTR SUCCEEDING					3	EB	T			
					10+	BPR*	Z			
RIGHT*: " "										
2			9	0	6	SB	T	10+	BPR	Z
					3	EB	T			
					10+	BPR	Z			

[1] measured from stake; [2] measured from stream; (WATER EDGE)

POPR

Soil type

File No.

Area GRAZED

Date 5/29/86

Stop No. UBC-L1

Classification COARSE LOAMY, MIXED, MESIC; Aquic Argisols

Location 30' BELOW EXCLUSION FENCE; 35' SE OF CHANNEL

N. veg. (or crop) POA SPECIES;

Climate

Parent material ALLOVIUM

Physiography VALLEY BOTTOM

Relief SLIGHTLY UNOULATING

Drainage MOD. WELL

Salt or alkali ϕ

Elevation

Gr. water 48"

Stoniness ϕ Slope < 3% $\perp$; < 2% $\parallel$ Moisture $\rightarrow$ SURFACE

Aspect

Root distrib.

% Clay*

Erosion ϕ

% Coarse fragments *

% Coarser than V.F.S. *

Permeability ϕ

Additional notes DISTURBED MEADOW; SCATTERED ARTB; RIVULET FROM UPLAND DRAIN CUTS THROUGH COMMUNITY

(DARKER ON PHOTO); many SHALLOW DRAINAGE CHANNELS (completely vegetated in community);

TOO EARLY FOR IDENTIFICATION OF GRASSES;

STREAM IS INCLUDED; JUBA IN DEEPENED MICROTOPOGRAPHY

* Aquic vs. XERIC SUBGROUPS DIFFERENTIATED based on mottles in lower part of mollic EPIPEDON; While this PEDON HAS MOTTLES IN A1Z HORIZON, IT IS MORE CHARACTERISTIC OF POPR SOILS TO BE NON-MOTTLED IN "A" SINCE "A" HORIZON IS TYPICALLY < 25 CM THICK;

* Control section average

 SCS-SOILS-232C
 12-70

SOIL DESCRIPTION

 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Site WBC-11 ()

Date 5/29/86

Elev _____ ft/ _____ m Slope _____ Aspect _____

Width/shape: EXTENDS FROM EDGE OF UPLAND TO CHANNEL. MINOR INCLUSIONS OF

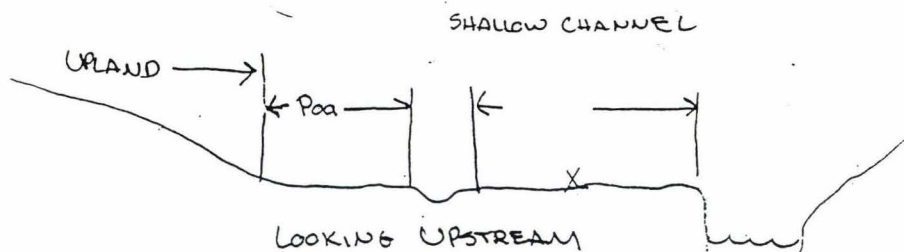
Microtopography: UNOULATING

Disturbance type and severity:

low
X medium - TORAXACUM;
high

General appearance/physiognomy:

SCATTERED ARTR
COVER RANGES FROM 75-80%
TOO EARLY TO IDENTIFY MANY SPECIES



Position in bottom:

-distance from stream 35'
-height above stream level ca 48"

Surrounding communities, nature of boundaries:

d=distinct (0-1 m); c=clear (1-5 m); g=gradual (5-10 m); df=diffuse (>10 m).

ARTR/

Hortensia, Mixed grass, snowberry

Litter/duff type, %coverage, depth: ϕ

Bare ground: 25%

Photo: Roll 1-#1 Community

Roll-1-#2 - STREAMBANK CONTIGUOUS TO COMMUNITY - NEAR TRAVERSE 59

Influenced by CREEK DISCHARGE FROM SOUTH

SPECIES LIST

Site UPC-L1Observer SMITH

RPR community

Data 5/29/1986

SHRUBS	cover	ht (dm)	TREES	o/r	cover	ht
1 <i>Artemisia tridentata</i>	1	8.0	1			
2 <i>Ribes aureum</i> (not in plot)			2			
3 <i>Rosa woodsii</i> (" ")			3			
4			4			
5			5			
6			6			
7			7			

	TREES	l/d	ht(m)	limb	c.d.	top	fk	shape
8								
9								
10								
11								
12								
13								
14								
15								

FORBS	cover	ht (dm)	20	
1 Cirsium	+	0.3	21	
2 Achillea millefolium	1	0.5	22	
3 Taraxacum officinale	2	1.0	23	
4 Aster spp.	1	0.4	24	
5 Trifolium (not in Plot)			25	
			GRAMINOIDS	cover ht(dm)
6 Thymopsis (1')			1 Agropyron trachypodium	2
7 Potentilla (" ")			2 Poa pratensis	3
8 Viola adunca (1' ")			3 Poa annua	1
9 Penda maritima (" ")			4 Poa spp.	
10 Ranunculus testicularis			5 Juncus balticus	1
11 Descurainia (" ")				
12			6	
13			7	
14			8	
15			9	
16			10	
17			11	
18			12	
19			13	

Ab - S=dom, 4, 3, 2, 1, $\frac{1}{2}$ = rare (or x)

crown class - D = dom, C = I, S, Rep. = seedlings

TOTAL COVER 75-85%

ASSOCIATION TABLES

PHYSIOGNOMY:	FORESTED								SHRUB									
COMMUNITY TYPE:	POTR/MH POTR-UP			AMEL-UP	ARTR-UP					ARTR/POPR			SALIX/MH					
PLOT CODE:	DL2	DL3	GL4	GL2	GR9	GL1	CR2	TL7	TR5	CR3	TR5	TR4	TL8	CR1	CR5	GR5	GR2	
WATER REGIME:	5	5	5	6	6	6	6	6	5	5	2	2	2	2	2	2		
TREES																		
Populus tremuloides	30	30	80	0	0	0	0	0	0	0	0	0	0	0	0	0		
SHRUBS																		
Alnus incana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Amelanchier spp.	0	0	2	30	<1	0	0	0	1	0	1	0	0	0	0	0		
Artemisia tridentata	0	1	0	10	10	45	55	45	30	50	30	0	0	<1	0	0	0	
Chrysothamnus nauseosus	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0		
Chrysothamnus viscidiflorus	0	0	0	1	2	1	2	1	0	0	0	0	0	0	0	0		
Cornus stolonifera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Prunus virginiana	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	n	
Purshia tridentata	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0		
Ribes aureum	0	0	0	0	0	0	0	0	1	1	1	0	5	<1	4	0	3	
Ribes cereum	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	
Ribes spp.	0	2	0	0	0	0	0	0	0	0	0	5	5	0	0	1		
Rosa woodsii	1	5	0	1	0	10	5	10	8	1	8	5	5	2	10	0		
Salix boothii	0	0	0	0	0	0	0	0	0	0	0	20	80	0	85	40	0	
Salix exigua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	7	
Salix geyeriana	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0		
Salix lasiandra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	90	
Salix lutea	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	n	
Salix spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Sambucus caerulea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	J	
Symphoricarpos oreophilus	0	0	4	5	2	1	0	1	0	0	0	0	0	0	0	0	0	
GRAMINOIDS																		
Agropyron spicatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Agropyron spp.	0	0	0	0	0	3	2	3	0	1	0	0	0	0	0	0	7	
Agropyron trachycaulum	20	25	0	<1	0	0	0	0	8	0	8	0	<1	0	1	0		
Agrostis scabra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Agrostis stolonifera	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	n	
Alopecurus aequalis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bromus carinatus	0	5	5	5	<1	0	0	0	0	0	0	0	0	0	0	0	J	
Bromus tectorum	5	0	0	0	1	35	2	35	1	0	1	0	0	15	0	0	0	
Calamagrostis canadensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carex aurea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carex douglasii	0	0	0	0	5	0	2	0	0	0	0	0	0	0	0	0	0	
Carex lanuginosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
Carex microptera	0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	2		

PHYSIOGNOMY:	FORESTED									SHRUB							
COMMUNITY TYPE:	POTR/MH POTR-UP			AMEL-UP	ARTR-UP				ARTR/POPR			SALIX/MH					
PLOT CODE:	DL2	DL3	GL4	GL2	GR9	GL1	CR2	TL7	TR5	CR3	TR5	TR4	TL8	CR1	CR5	GR5	GR2
WATER REGIME:	5	5	5	6	6	6	6	6	5	5	2	2	2	2	2	2	2

GRAMINOIDS (CONTINUED)

Carex nebrascensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carex praegracilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carex spp.	0	0	0	0	0	0	0	0	0	8	0	0	0	0	1	2	0
Catabrosa aquatica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deschampsia caespitosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deschampsia danthonioides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis palustris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eleocharis rostellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus cinereus	0	2	0	5	3	3	0	3	0	<1	0	0	0	0	0	0	0
Elymus triticoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equisetum arvense	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
Equisetum spp.	0	2	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
Festuca idahoensis	0	0	0	0	0	<1	0	<1	0	0	0	0	0	0	0	0	0
Glyceria spp.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Hordeum brachyantherum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Juncus balticus	0	0	0	0	0	0	0	0	10	1	10	0	0	0	3	0	0
Juncus bufonius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus ensifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Juncus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Melica bulbosa	0	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Muhlenbergia richardsonis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phleum pratense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa annua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa palustris	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa pratensis	50	25	4	1	3	0	0	0	25	15	25	30	25	15	25	15	15
Poa secunda	0	0	0	0	<1	1	2	1	0	1	0	0	0	0	0	0	0
Poa spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0
Scirpus microcarpus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Sitanion hystrix	0	0	0	0	1	<1	2	<1	0	0	0	0	0	0	0	0	0
Stipa comata	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Stipa spp.	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Typha latifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[illegible]

PHYSIOGNOMY:	FORESTED									SHRUB								
COMMUNITY TYPE:	POTR/MH POTR-UP			AMEL-UP	ARTR-UP					ARTR/POPR			SALIX/MH					
PLOT CODE:	DL2	DL3	GL4	GL2	GR9	GL1	CR2	TL7		TR5	CR3	TR5	TR4	TL8	CR1	CR5	GR5	GR2
WATER REGIME:	5	5	5	6	6	6	6	6		5	5	2	2	2	2	2	2	2
FORBS (CONTINUED)																		
Hackelia spp.	0	0	<1	<1	1	0	0	0		0	0	0	0	1	<1	<1	0	0
Hydrophyllum capitatum	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hypericum scouleri	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Iris missouriensis	0	1	0	0	0	<1	0	<1		<1	<1	<1	0	0	0	0	0	0
Iva axillaris	0	0	0	0	<1	0	0	0		1	0	1	0	0	0	0	0	0
Lactuca serriola	0	0	0	0	0	<1	0	<1		0	0	0	0	0	0	0	0	<1
Lappula occidentalis	0	0	0	0	0	0	<1	0		0	0	0	0	0	0	0	0	0
Lepidium virginicum	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Lithofragma parviflora	0	0	<1	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Lithospermum ruderale	0	0	0	2	<1	<1	0	<1		0	0	0	0	0	0	0	0	0
Lomatium dissectum	0	0	0	1	0	0	0	0		0	0	0	0	0	0	0	0	0
Lupinus spp.	0	1	0	0	0	0	<1	0		0	<1	0	0	0	<1	0	0	0
Marrubium vulgare	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Medicago lupulina	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mentha arvensis	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mentzelia spp.	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mertensia ciliata	0	0	<1	0	0	0	0	0		0	0	0	0	0	0	0	0	10
Mertensia oblongifolia	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Microsteris gracilis	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mimulus guttatus	0	0	0	0	0	0	0	0		0	0	0	<1	0	0	0	<1	0
Mimulus lewisii	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mimulus moschatus	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Montia perfoliata	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Nasturtium officinale	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Oenothera hookeri	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Osmorhiza occidentalis	0	0	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Penstemon humilus	0	0	0	0	<1	0	0	0		0	0	0	0	0	0	0	0	0
Penstemon speciosus	0	0	0	0	<1	0	0	0		0	0	0	0	0	0	0	0	0
Phacelia hastata	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Plantago major	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	<1
Polygonum spp.	0	0	0	<1	<1	0	0	0		0	0	0	0	0	0	0	0	0
Potentilla biennis	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Potentilla gracilis	0	0	<1	0	<1	0	0	0		<1	<1	<1	0	0	0	0	0	0
Potentilla spp.	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Ranunculus cymbalaria	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Ranunculus testiculatus	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rumex acetosella	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rumex crispus	0	0	<1	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rumex salicifolius	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Sagina saginoides	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Scrophularia lanceolata	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Senecio hydrophilus	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	<1	0
Senecio integerrimus	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:

FORESTED

SHRUB

COMMUNITY TYPE:

POTR/MH POTR-UP

AMEL-UP

ARTR-UP

ARTR/POPR

SALIX/MH

PLOT CODE:

DL2 DL3 GL4

GL2

GR9

GL1

CR2

TL7

TR5

CR3

TR5

TR4

TL8

CR1

CR5

GR5

GR

WATER REGIME:

5 5 5

6

6

6

6

6

5

5

2

2

2

2

2

2

2

FORBS (CONTINUED)

Senecio serra	0	0	5	1	0	0	0	0	0	0	0	0	<1	0	0	0	2
Senecio spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senecio streptanthifolius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Sidalcea oregana	0	0	0	<1	0	0	0	0	0	0	0	0	<1	0	0	0	<1
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1
Sisyrinchium halophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smilacina stellata	0	0	0	0	0	0	0	0	0	0	0	<1	2	0	1	<1	0
Sonchus oleraceus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stellaria spp.	0	0	0	0	0	0	0	0	0	0	0	<1	<1	0	0	<1	0
Taraxacum officinale	0	<1	0	0	<1	<1	<1	<1	0	1	0	1	<1	4	<1	0	0
Thlaspi arvense	0	0	0	0	0	0	0	0	<1	0	<1	0	0	0	0	0	<1
Thlaspi montanum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragopogon dubius	0	<1	0	<1	<1	0	0	0	<1	0	<1	0	0	0	0	0	0
Trifolium cyathiferum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium wormskejoldii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0
Urtica dioica	0	0	<1	0	0	0	0	0	0	0	0	<1	2	2	1	0	1
Verbascum thapsus	0	0	0	0	0	0	0	0	<1	0	<1	0	0	0	0	0	0
Veronica americana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veronica serpyllifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Viola adunca	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Viola spp.	0	3	<1	<1	0	0	0	0	0	0	0	0	0	0	0	0	0
Wyethia amplexicaulis	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Zigadenus paniculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ASSOCIATION TABLES
(CONTINUED)

PHYSIOGNOMY:

HERBACEOUS

COMMUNITY TYPE

POPR

JUBA

SCMI

CANE

CAVE

ELPA

PLOT

WATER REGIME

GR6	GL3	GL3A	TL5	TL3	DR2	DL1	CR6	TL1	GR6	TR2	TL6	DR1	GR4	GR3	GR1
2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4

TREES

<i>Populus tremuloides</i>	0	0	0	0	0	<1	1	0	0	0	0	<1	0	0	0
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SHRUBS

<i>Alnus incana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Amelanchier</i> spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Artemisia tridentata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Chrysothamnus nauseosus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Chrysothamnus viscidiflorus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cornus stolonifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Prunus virginiana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Purshia tridentata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ribes aureum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ribes cereum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ribes</i> spp.	0	0	0	0	0	<1	1	0	0	0	0	0	0	0	0
<i>Rosa woodsii</i>	0	0	0	0	0	<1	1	1	0	0	0	<1	0	0	0
<i>Salix boothii</i>	0	0	0	0	0	0	1	0	<1	0	0	0	0	0	0
<i>Salix exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Salix geyeriana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Salix lasiandra</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Salix lutea</i>	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
<i>Salix</i> spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sambucus caerulea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Symphoricarpos oreophilus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

GRAMINOIDS

<i>Agropyron spicatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Agropyron</i> spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Agropyron trachycaulum</i>	0	0	1	3	1	0	0	1	<1	0	0	0	0	0	0
<i>Agrostis scabra</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>Agrostis stolonifera</i>	0	2	0	<1	0	0	0	1	3	<1	0	5	0	0	<1
<i>Alopecurus aequalis</i>	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
<i>Bromus carinatus</i>	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Bromus tectorum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Calamagrostis canadensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Carex aurea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Carex douglasii</i>	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
<i>Carex lanuginosa</i>	10	0	0	0	0	0	<1	0	0	0	0	0	0	0	0
<i>Carex microptera</i>	3	0	1	0	0	0	0	0	0	<1	0	0	0	0	<1
<i>Carex nebrascensis</i>	0	0	0	0	0	0	0	1	0	0	95	30	0	0	<1
<i>Carex praegracilis</i>	5	25	5	0	0	0	0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:		HERBACEOUS															
COMMUNITY TYPE		POPR								JUBA	SCMI	CANE		CAVE			ELPA
PLOT		GR6	GL3	GL3A	TL5	TL3	DR2	DL1	CR6	TL1	GR6	TR2	TL6	DR1	GR4	GR3	GR
WATER REGIME		2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4
GRAMINOIDS (CONTINUED)																	
Carex spp.		0	0	0	4	5	1	3	3	0	0	0	0	0	0	0	0
Carex vesicaria		0	0	0	0	0	0	0	0	0	0	0	0	85	70	15	0
Catabrosa aquatica		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deschampsia caespitosa		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deschampsia danthonioides		0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Eleocharis palustris		0	0	0	0	0	0	0	0	0	0	0	<1	0	0	0	3
Eleocharis rostellata		0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	1
Elymus cinereus		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elymus triticoides		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equisetum arvense		0	0	4	0	0	0	<1	0	0	0	0	0	0	0	0	0
Equisetum sp.		0	0	0	1	10	0	0	0	5	<1	0	0	0	0	0	0
Festuca idahoensis		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glyceria spp.		0	0	0	0	0	0	5	0	0	0	0	5	3	0	0	<
Hordeum brachyantherum		0	5	0	0	0	0	2	0	0	0	<1	0	0	0	0	0
Juncus balticus		15	15	4	1	0	3	0	1	20	<1	<1	<1	0	0	0	<1
Juncus bufonius		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus ensifolius		0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	<
Juncus spp.		0	0	0	0	0	0	0	<1	0	0	0	1	0	0	0	<1
Melica bulbosa		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muhlenbergia richardsonis		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phleum pratense		0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa annua		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa palustris		0	0	0	0	0	<1	40	0	0	0	0	0	0	0	0	0
Poa pratensis		30	25	25	35	20	50	25	30	15	10	0	10	5	0	0	0
Poa secunda		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poa spp.		0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
Scirpus microcarpus		0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	<
Sitanion hystrix		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stipa comata		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stipa spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Typha latifolia		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:		HERBACEOUS															
COMMUNITY TYPE		POPR								JUBA	SCM1	CANE		CAVE			ELPA
PLOT		GR6	GL3	GL3A	TL5	TL3	DR2	DL1	CR6	TL1	GR6	TR2	TL6	DR1	GR4	GR3	GR1
WATER REGIME		2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4
FORBS																	
Achillea millefolium		<1	2	2	3	2	5	1	2	0	<1	0	<1	0	0	0	0
Aconitum columbianum		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agastache urticifolia		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agoseris glauca		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allium acuminatum		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allium spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Allysum alyssioides		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Angelica kingii		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aquilegia formosa		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabis holboellii		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arabis spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arnica sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arnica cordifolia		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artemisia ludoviciana		0	0	<1	0	0	0	0	<1	0	<1	0	0	0	0	0	0
Aster occidentalis		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aster spp.		0	1	5	3	10	3	5	0	3	0	0	0	0	0	0	0
Astragalus spp.		0	0	1	<1	0	0	<1	0	0	0	0	0	0	0	0	0
Astragalus agrestis		0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Balsamorhiza sagittata		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbarea spp.		0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Calochortus nuttallii		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Camelina microcarpa		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capsella bursa-pastoris		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerastium fotanum		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaenactis douglasii		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cirsium arvense		0	0	0	2	0	0	5	0	<1	0	0	0	0	0	0	0
Cirsium scariosum		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Cirsium vulgare		0	0	0	0	0	0	<1	<1	0	0	0	0	0	0	0	0
Collinsia parviflora		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Collomia linearis		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Comandra umbellata		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corydalis aurea		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crepis acuminata		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cryptantha spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Descuriania spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epilobium ciliatum		<1	<1	0	0	0	0	5	0	0	<1	<1	10	<1	0	1	2
Erigeron spp.		0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0	0
Galium aparine		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galium biflorum		0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Gayophytum spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geranium spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geum macrophyllum		0	0	0	0	0	3	1	0	<1	0	0	0	0	0	0	0
Gilia aggregata		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Habenaria dilatata		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hackelia spp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:

HERBACEOUS

COMMUNITY TYPE

POPR

JUBA

SCMI

CANE

CAVE

ELP.

PLOT

WATER REGIME

GR6

GL3

GL3A

TL5

TL3

DR2

DL1

CR6

TL1

GR6

TR2

TL6

DR1

GR4

GR3

GR1

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FORBS (CONTINUED)

Hydrophyllum capitatum

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Hypericum scouleri

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Iris missouriensis

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Iva axillaris

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Lactuca serriola

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Lappula occidentalis

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Lepidium virginicum

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Lithofragma parviflora

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Lithospermum ruderale

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Lomatium dissectum

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Lupinus spp.

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Marrubium vulgare

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Medicago lupulina

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Mentha arvensis

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Mentzelia spp.

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Mertensia ciliata

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Mertensia oblongifolia

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Microsteris gracilis

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Mimulus guttatus

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PHYSIOGNOMY:		HERBACEOUS															
COMMUNITY TYPE		POPR								JUBA	SCM1	CANE		CAVE		ELPA	
PLOT		GR6	GL3	GL3A	TL5	TL3	DR2	DL1	CR6	TL1	GR6	TR2	TL6	DR1	GR4	GR3	GR1
WATER REGIME		2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4
FORBS (CONTINUED)																	
Senecio streptanthifolius		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sidalcea oregana		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sisymbrium altissimum		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sisyrinchium halophilum		0	0	0	0	<1	0	0	0	<1	0	0	0	0	0	0	0
Smilacina stellata		0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sonchus oleraceus		0	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	0
Stellaria spp.		<1	<1	<1	0	0	0	0	1	0	0	0	<1	0	0	0	0
Taraxacum officinale		2	1	4	8	3	1	2	2	<1	<1	0	0	0	0	0	0
Thlaspi arvense		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thlaspi montanum		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tragopogon dubius		0	0	0	<1	<1	0	0	0	0	0	0	0	0	0	0	0
Trifolium cyathiferum		0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trifolium wormskejoldii		0	2	0	0	0	0	0	0	0	0	0	0	0	0	<1	1
Urtica dioica		0	0	0	0	0	0	0	0	0	<1	0	0	0	0	0	0
Verbascum thapsus		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veronica americana		0	<1	0	0	0	0	0	<1	0	<1	<1	2	<1	<1	0	1
Veronica serpyllifolia		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Viola adunca		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Viola spp.		0	0	0	0	0	1	0	0	<1	0	0	<1	0	0	0	0
Wyethia amplexicaulis		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zigadenus paniculatus		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ASSOCIATION TABLES
(CONTINUED)

PHYSIOGNOMY:	STREAMBAR										
COMMUNITY TYPE:	GB			SB		HSB	HGB	SALIX/SB	SALIX/DWM		
PLOT CODE:	CL1	TR4	GR7	CR4	TR3	GR7	TR1	TL2	TA	TB	TC
WATER REGIME:	3	3	3	3	3	3	3	3	3	3	3
TREES											
Populus tremuloides	0	0	0	0	0	0	0	0	0	0	0
SHRUBS											
Alnus incana	<1	0	0	0	0	0	0	0	0	0	0
Amelanchier spp.	0	0	0	0	0	0	0	0	0	0	0
Artemisia tridentata	1	1	0	<1	0	0	<1	0	0	0	0
Chrysothamnus nauseosus	0	0	0	0	0	0	0	0	0	0	0
Chrysothamnus viscidiflorus	0	0	0	0	0	0	0	0	0	0	0
Cornus stolonifera	0	0	0	0	0	0	0	0	0	0	0
Prunus virginiana	0	0	0	0	0	0	0	0	0	0	0
Purshia tridentata	0	0	0	0	0	0	0	0	0	0	0
Ribes aureum	0	1	0	0	0	0	0	0	0	0	0
Ribes cereum	0	0	0	0	0	0	0	0	0	0	0
Ribes spp.	0	3	0	0	0	0	0	0	0	5	0
Rosa woodsii	1	2	0	0	0	0	0	0	20	8	0
Salix boothii	0	5	0	0	0	0	0	1	100	90	100
Salix exigua	0	0	0	<1	<1	0	0	1	0	0	0
Salix geyeriana	0	0	0	0	0	0	0	0	0	0	0
Salix lasiandra	0	0	0	0	3	0	0	1	0	0	0
Salix lutea	0	<1	0	0	1	0	10	40	0	0	0
Salix spp.	<1	0	0	0	0	0	0	0	0	0	0
Sambucus caerulea	0	0	0	0	0	0	0	0	0	0	0
Symphoricarpos oreophilus	0	0	0	0	0	0	0	0	0	0	0
GRAMINOIDS											
Agropyron spicatum	0	0	0	0	0	0	0	0	0	0	0
Agropyron spp.	<1	0	0	0	0	0	0	0	0	0	0
Agropyron trachycaulum	<1	1	0	0	0	0	1	<1	0	0	0
Agrostis scabra	<1	0	0	0	0	0	<1	0	0	0	0
Agrostis stolonifera	0	0	<1	0	8	<1	1	<1	0	0	0
Alopecurus aequalis	0	0	0	5	8	0	0	<1	0	0	0
Bromus carinatus	0	0	0	0	0	0	0	0	0	0	0
Bromus tectorum	1	15	0	<1	0	0	6	<1	0	0	0
Calamagrostis canadensis	0	0	0	0	0	0	0	0	0	0	0
Carex aurea	0	0	0	0	0	0	0	0	0	0	0
Carex douglasii	0	0	0	0	0	0	0	0	0	0	0
Carex lanuginosa	0	0	0	0	0	0	0	0	0	0	0
Carex microptera	1	0	1	0	<1	1	0	<1	0	0	0
Carex nebrascensis	0	0	0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:

STREAMBAR

COMMUNITY TYPE:

GB

SB

HSB

HGB SALIX/SB

SALIX/DWM

PLOT CODE:

CL1

TR4

GR7

CR4

TR3

GR7

TR1

TL2

TA

TB

TC

WATER REGIME:

3

3

3

3

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GRAMINOIDS (CONTINUED)

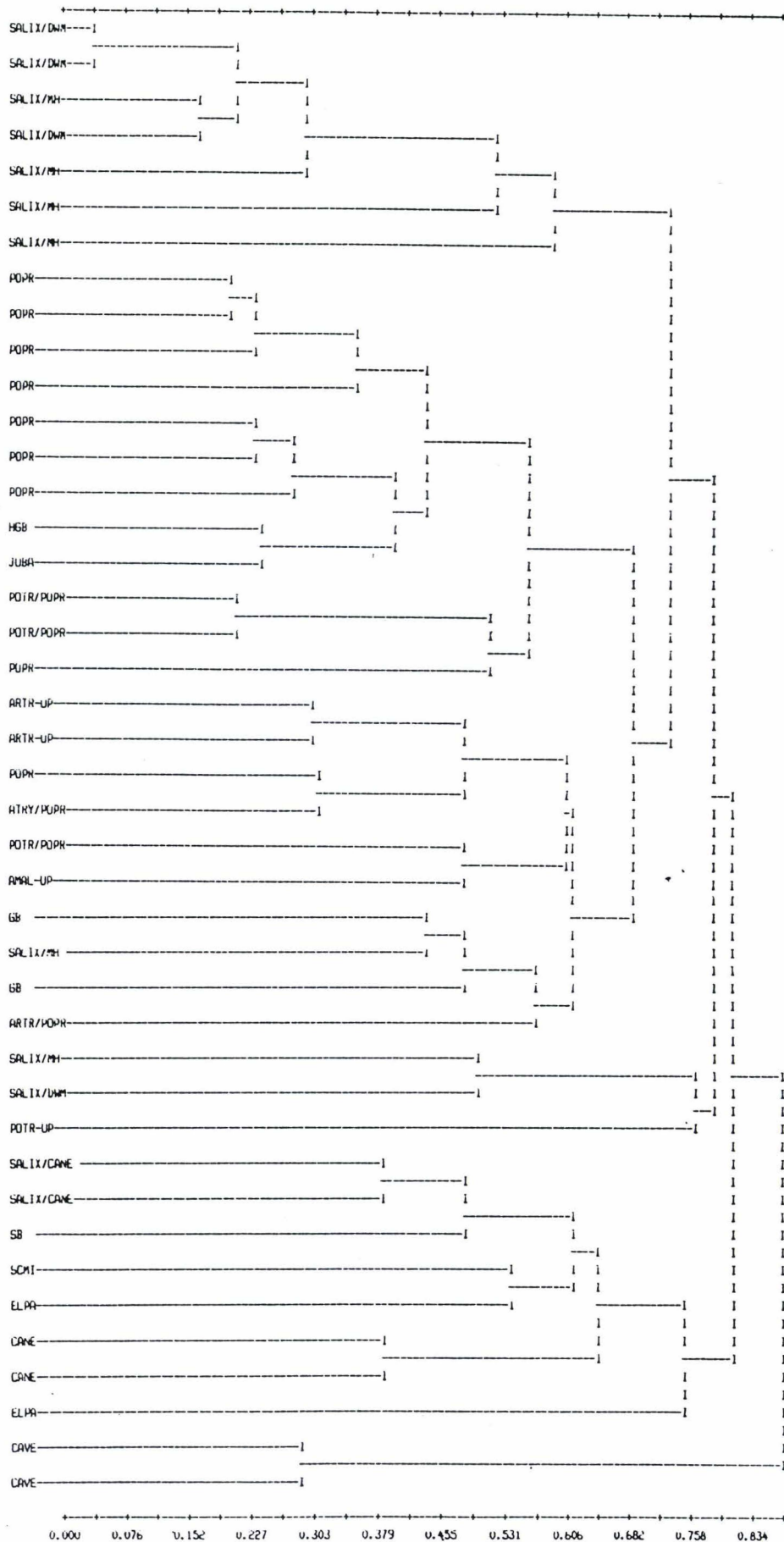
Carex praegracilis	0	0	0	0	0	0	0	0	0	0	0
Carex spp.	0	<1	0	0	0	0	0	0	0	0	0
Carex vesicaria	0	0	0	0	0	0	0	0	0	0	0
Catabrosa aquatica	0	0	0	0	0	0	0	0	0	0	0
Deschampsia caespitosa	0	0	0	0	0	0	0	0	0	0	0
Deschampsia danthonioides	0	0	0	0	0	0	0	0	0	0	0
Eleocharis palustris	0	0	0	0	0	0	0	0	0	0	0
Eleocharis rostellata	0	0	0	0	0	0	0	0	0	0	0
Elymus cinereus	0	0	0	0	0	0	0	0	0	0	0
Elymus triticoides	0	0	0	0	0	0	0	0	0	0	0
Equisetum arvense	0	0	4	0	2	0	0	0	0	0	0
Equisetum sp.	0	0	0	0	0	4	0	0	0	0	<1
Festuca idahoensis	0	0	0	0	0	0	0	0	0	0	0
Glyceria spp.	0	0	0	0	3	0	<1	0	0	0	0
Hordeum brachyantherum	<1	0	0	0	<1	0	0	0	0	0	0
Juncus balticus	0	<1	10	0	<1	10	0	0	0	0	0
Juncus bufonius	0	0	0	0	0	0	0	0	0	0	0
Juncus ensifolius	0	0	<1	<1	0	0	0	0	0	0	0
Juncus spp.	<1	0	0	0	<1	<1	0	0	0	0	0
Melica bulbosa	0	0	0	0	0	0	0	0	0	0	0
Muhlenbergia richardsonis	<1	0	0	0	0	0	0	0	0	0	0
Phleum pratense	0	0	0	0	0	0	0	0	0	0	0
Poa annua	0	0	0	0	0	0	0	0	0	0	0
Poa palustris	0	0	0	0	0	0	0	0	0	0	0
Poa pratensis	1	2	12	5	4	12	4	2	3	<1	1
Poa secunda	0	0	0	0	0	0	0	0	0	0	0
Poa spp.	1	0	0	0	0	0	0	0	0	0	0
Scirpus microcarpus	0	0	<1	0	0	<1	0	0	0	0	0
Sitanion hystrix	0	0	0	0	0	0	0	0	0	0	0
Stipa comata	0	0	0	0	0	0	0	0	0	0	0
Stipa spp.	0	0	0	0	0	0	0	0	0	0	0
Typha latifolia	0	0	0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:		STREAMBAR										
COMMUNITY TYPE:		GB			SB		HSB	HGB	SALIX/SB	SALIX/DWM		
PLOT CODE:		CL1	TR4	GR7	CR4	TR3	GR7	TR1	TL2	TA	TB	TC
WATER REGIME:		3	3	3	3	3	3	3	3	3	3	3
FORBS												
Achillea millefolium		2	0	0	0	0	0	<1	0	0	0	0
Aconitum columbianum		0	0	0	0	0	0	0	0	0	0	0
Agastache urticifolia		0	0	0	0	0	0	0	0	0	0	0
Agoseris glauca		0	0	0	0	0	0	0	0	0	0	0
Allium acuminatum		0	0	0	0	0	0	0	0	0	0	0
Allium spp.		0	0	0	0	0	0	0	0	0	0	0
Allysum alyssioides		0	0	0	0	0	0	0	0	0	0	0
Angelica kingii		0	0	0	0	0	0	0	0	0	0	0
Aquilegia formosa		0	0	0	0	0	0	0	0	0	0	0
Arabis holboellii		0	0	0	0	0	0	0	0	0	0	0
Arabis spp.		<1	0	0	0	0	0	<1	0	0	0	0
Arnica sp.		0	0	0	0	0	0	0	0	0	0	0
Arnica cordifolia		0	0	0	0	0	0	0	0	0	0	0
Artemisia ludoviciana		3	<1	0	0	0	0	1	0	0	0	0
Aster occidentalis		0	0	0	0	0	<1	0	0	0	0	0
Aster spp.		1	<1	<1	0	0	0	<1	0	0	0	0
Astragalus spp.		0	0	0	0	0	0	<1	0	0	0	0
Astrgalus agrestis		0	0	0	0	0	0	0	0	0	0	0
Balsamorhiza sagittata		0	0	0	0	0	0	0	0	0	0	0
Barbarea spp.		0	0	<1	0	0	<1	0	0	0	0	0
Calochortus nuttallii		0	0	0	0	0	0	0	0	0	0	0
Camelina microcarpa		0	0	0	0	0	0	0	0	0	0	0
Capsella bursa- pastoris		0	0	0	0	0	0	0	0	0	0	0
Cerastium fotanum		0	0	0	0	0	0	0	0	0	0	0
Chaenactis douglasii		0	0	0	0	0	0	0	0	0	0	0
Cirsium arvense		0	<1	0	0	0	0	0	0	0	0	0
Cirsium scariosum		0	0	<1	0	0	<1	0	0	0	0	0
Cirsium vulgare		<1	0	0	0	0	0	<1	0	0	0	0
Collinsia parviflora		0	0	0	0	0	0	0	0	0	0	0
Collomia linearis		<1	0	0	0	0	0	0	0	0	0	0
Comandra umbellata		0	0	0	0	0	0	0	0	0	0	0
Corydalis aurea		0	0	0	0	0	0	0	0	0	0	0
Crepis acuminata		0	0	0	0	0	0	0	0	0	0	0
Cryptantha spp.		0	0	0	0	0	0	0	0	0	0	0
Descuriania spp.		0	5	0	0	0	0	0	0	0	0	0
Epilobium ciliatum		<1	0	1	<1	0	1	6	1	0	0	0
Erigeron spp.		0	0	0	0	0	0	0	0	0	0	0
Galium aparine		0	0	0	0	0	0	0	0	5	1	0
Galium biflorum		0	0	0	0	0	0	0	0	0	0	0
Gayophytum spp.		<1	<1	0	0	0	0	<1	1	0	0	0
Geranium spp.		0	0	0	0	0	0	0	0	0	0	0
Geum macrophyllum		<1	0	0	0	0	0	0	0	0	0	0
Gilia aggregata		0	0	0	0	0	0	0	0	0	0	0
Habenaria dilatata		0	0	0	0	0	0	0	0	0	0	0
Hackelia spp.		0	0	0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:	STREAMBAR										
COMMUNITY TYPE:	GB			SB		HSB	HGB	SALIX/SB	SALIX/DWM		
PLOT CODE:	CL1	TR4	GR7	CR4	TR3	GR7	TR1	TL2	TA	TB	TC
WATER REGIME:	3	3	3	3	3	3	3	3	3	3	3
FORBS (CONTINUED)											
Hydrophyllum capitatum	0	0	0	0	0	0	0	0	0	0	0
Hypericum scouleri	0	0	0	0	0	0	0	0	0	0	0
Iris missouriensis	0	0	0	0	0	0	0	0	0	0	0
Iva axillaris	0	0	0	0	0	0	0	0	0	0	0
Lactuca serriola	0	10	0	0	0	0	<1	<1	0	0	0
Lappula occidentalis	0	0	0	0	0	0	0	0	0	0	0
Lepidium virginicum	0	0	0	0	0	0	0	0	0	0	0
Lithofragma parviflora	0	0	0	0	0	0	0	0	0	0	0
Lithospermum ruderales	0	0	0	0	0	0	0	0	0	0	0
Lomatium dissectum	0	0	0	0	0	0	0	0	0	0	0
Lupinus spp.	0	0	0	0	0	0	0	0	0	0	0
Marrubium vulgare	0	0	0	0	0	0	0	0	0	0	0
Medicago lupulina	0	0	0	0	0	0	0	<1	0	0	0
Mentha arvensis	<1	<1	0	0	0	0	<1	0	0	0	0
Mentzelia spp.	0	0	0	0	0	0	0	0	0	0	0
Mertensia ciliata	0	0	0	0	0	0	0	0	0	0	0
Mertensia oblongifolia	0	0	0	0	0	0	0	0	0	0	0
Microsteris gracilis	0	0	0	0	0	0	0	0	0	0	0
Mimulus guttatus	0	0	2	2	1	2	0	<1	0	0	0
Mimulus lewisii	0	0	0	<1	0	0	0	0	0	0	0
Mimulus moschatus	0	0	0	0	0	0	0	0	0	0	0
Montia perfoliata	0	0	0	0	0	0	0	0	0	0	0
Nasturtium officinale	0	0	0	<1	0	0	0	0	0	0	0
Oenothera hookeri	0	0	0	0	0	0	0	0	0	0	0
Osmorhiza occidentalis	0	0	0	0	0	0	0	0	0	0	0
Penstemon humilis	0	0	0	0	0	0	0	0	0	0	0
Penstemon speciosus	0	0	0	0	0	0	0	0	0	0	0
Phacelia hastata	<1	0	0	0	0	0	0	0	0	0	0
Plantago major	0	0	0	<1	0	0	0	0	0	0	0
Polygonum spp.	0	0	0	0	0	0	0	0	0	0	0
Potentilla biennis	0	0	0	<1	0	<1	<1	0	0	0	0
Potentilla gracilis	0	<1	<1	0	0	<1	0	0	0	0	0
Potentilla spp.	0	0	<1	0	0	0	0	0	0	0	0
Ranunculus cymbalaria	0	0	2	0	1	2	0	<1	0	0	0
Ranunculus testiculatus	0	0	0	0	0	0	0	0	0	0	0
Rumex acetosella	0	0	0	0	0	0	0	0	0	0	0
Rumex crispus	<1	<1	0	<1	<1	0	<1	0	0	0	0
Rumex salicifolius	0	0	0	0	0	0	0	0	0	0	0
Sagina saginoides	0	0	1	2	0	1	0	0	0	0	0
Scrophularia lanceolata	0	0	0	0	0	0	0	0	0	0	0

PHYSIOGNOMY:	STREAMBAR										
COMMUNITY TYPE:	GB			SB		HSB	HGB	SALIX/SS	SALIX/DWM		
PLOT CODE:	CL1	TR4	GR7	CR4	TR3	GR7	TR1	TL2	TA	TB	TC
WATER REGIME:	3	3	3	3	3	3	3	3	3	3	3
FORBS (CONTINUED)											
Senecio hydrophilus	0	0	0	0	0	0	0	0	0	0	0
Senecio integerrimus	0	0	0	0	0	0	0	0	0	0	0
Senecio serra	0	0	0	0	0	0	0	0	0	0	0
Senecio spp.	0	0	0	0	0	0	0	0	0	0	0
Senecio streptanthifolius	0	0	0	0	0	0	0	0	0	0	0
Sidalcea oregana	0	0	0	0	0	0	0	0	0	0	0
Sisymbrium altissimum	0	0	0	0	0	0	0	0	0	0	0
Sisyrinchium halophilum	0	0	0	0	0	0	0	0	0	0	0
Smilacina stellata	0	0	0	0	0	0	0	0	5	<1	<1
Sonchus oleraceus	0	0	0	0	0	0	<1	0	0	0	0
Stellaria spp.	1	0	0	0	0	0	<1	0	0	0	0
Taraxacum officinale	1	0	<1	0	0	<1	<1	0	0	0	0
Thlaspi arvense	0	8	0	0	0	0	0	0	0	0	0
Thlaspi montanum	0	0	0	0	0	0	0	0	0	0	0
Tragopogon dubius	0	<1	<1	0	0	0	0	<1	0	0	0
Trifolium cyathiferum	0	0	0	0	<1	<1	1	0	0	0	0
Trifolium wormskjoldii	0	0	0	0	0	0	0	0	0	0	0
Urtica dioica	0	2	0	0	0	0	1	0	3	<1	0
Verbascum thapsus	0	1	0	0	<1	0	1	<1	0	0	0
Veronica americana	0	0	<1	5	3	<1	0	0	0	0	0
Veronica serpyllifolia	0	0	0	0	0	0	0	<1	0	0	0
Viola adunca	0	0	0	0	0	0	0	0	0	0	0
Viola spp.	0	0	0	0	0	0	0	0	0	0	0
Wyethia amplexicaulis	0	0	0	0	0	0	0	0	0	0	0
Zigadenus paniculatus	0	0	0	0	0	0	0	0	0	0	0

CLUSTER DIAGRAM
PLANT SPECIES COMPOSITION
LIVESTOCK/FISHERIES STUDY AREAS
NEVADA



APPENDIX D - SOIL DESCRIPTIONS

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Community Type: Populus tremuloides/mesic herbaceous (POTR/MH)
Area: Deer Creek; near transect L59;
Classification: Loamy-skeletal, mixed, frigid, Aquic Argiboroll
Parent Material: alluvium from rhyolite;
Physiography: toe of steep alluvial fan;
Slope: 4 to 10 percent perpendicular to streamflow; west aspect;
Ground Water: ca. 30 inches on 10/1/86;
Description: (Site DL2)

A (0-10 inches) Dry; dark grayish brown (10YR4/2) silt loam; very dark brown (10YR2/2) moist; moderate, medium, granular structure; slightly hard, friable, slightly sticky and slightly plastic; noncalcareous; common very-fine, fine and few medium roots; few fine pores; gradual, smooth boundary.

Bt (10-15 inches) Dry; grayish brown (10YR5/2) loam; very dark grayish brown (10YR3/2) moist; moderate, medium, subangular-blocky structure; slightly hard, friable, slightly sticky and slightly plastic; moderately thick clay skins on ped faces and in pores; noncalcareous; few very fine roots; few fine pores; diffuse boundary.

C1(15-25 + inches) Slightly moist; Brown (10YR5/3) sandy loam with 50 percent (volume) angular rhyolite cobble; dark brown (10YR4/3) moist; massive; nonsticky and nonplastic; no roots; no pores.

Community Type: Salix spp./Mesic herbaceous (SALIX/MH)
Area: Tabor Creek; 30 feet south of stream; upper enclosure;
Classification: Loamy-skeletal, mixed, frigid, Fluvaquentic
Haploboroll;
Parent Material: Fluvium/alluvium from mixed sources;
Physiography: Divorced channel levee;
Slope: Not applicable;
Ground Water: 30 inches on 7/1/86;
Description: (Site TL8)

A1 (0-10 inches) Slightly moist; Very dark brown (10YR3/2) fine- loam; strong, medium granular structure; friable, slightly plastic and slightly icky; few very fine, fine, medium and coarse roots; few very fine pores; clear smooth boundary.

C1 (10-28 inches) Moist; Brown (10YR4/3) very gravelly sandy loam; common, medium, prominent mottles; massive; loose, nonsticky and nonplastic; noncalcareous; few very fine, fine, medium and coarse roots; no pores.

C2 (28-40 inches) Wet; dark gray (10YR4/1), stratified very fine sandy loam and very gravelly loamy sand; single grain; loose, nonsticky and nonplastic; few fine and medium roots; no pores.

C3 (40 + inches) Saturated; dark greenish gray (5G4/1) extremely gravelly loamy sand; single grain; loose, nonsticky and nonplastic; noncalcareous; no roots; no pores.

Community Type: Salix spp./Mesic herbaceous (SALIX/MH)
Area: Gance Creek; 30 feet south of stream; upper enclosure;
Classification: Loamy-skeletal, mixed, frigid, Aquic Ustifluvent; Parent
Material: Fluvium from mixed sources;
Physiography: Active channel levee;
Slope: Not applicable;
Ground Water: 48 inches on 6/18/86;
Description: (Site GR2)

A1 (0-6 inches) Dry; grayish brown (10YR5/2) gravelly loam; very dark grayish brown (10YR3/2) moist; moderate, medium granular structure; soft, very friable, nonsticky and nonplastic; noncalcareous; common very fine and fine roots, few medium and coarse roots; no pores; clear, smooth boundary.

AC (6-30 inches) Slightly moist; brown (10YR4/3) very gravelly sandy loam; few, fine prominent mottles; weak, fine, subangular blocky structure; soft, very friable, nonsticky and nonplastic; noncalcareous; few very fine, fine and medium roots, few coarse roots; no pores; clear, smooth boundary.

C1 (30-36 inches) Moist; brown (10YT5/3) extremely gravelly loamy coarse-sand; single grained; loose, nonsticky and nonplastic; noncalcareous; few fine roots; no pores; clear smooth boundary.

C2 (36 + inches) Saturated; dark greenish gray (5G4/1) very gravelly sandy loam; massive; slightly sticky and slightly plastic; noncalcareous; few fine roots; no pores.

Community Type: Artemisia tridentata/Poa pratensis (ARTR/POPR)
Area: Tabor Creek
Classification: Loamy, mixed, frigid, Fluvaquentic Haploboroll
Parent Material: Fluvium
Physiography: floodplain
Slope: 2 to 3 percent parallel with valley;
Ground Water: 45 inches on 7/1/86;
Description: (Site TR5)

A1 (0-8 inches) Dry; very dark grayish brown (10YR3/2) loam; moderate medium granular structure; slightly hard, friable, nonsticky and nonplastic; noncalcareous; common very fine, few fine, medium and coarse roots; no pores; gradual smooth boundary.

A2 (8-16 inches) Dry; very dark grayish brown (10YR3/2) loam; moderate, medium prismatic parting to strong, medium subangular blocky; hard, very firm, nonsticky and nonplastic; noncalcareous; few fine, medium and coarse roots; common fine and few medium pores; gradual smooth boundary.

B2 (16-32 inches) Dry; brown (10YR4/3) loam; few, fine, prominent mottles; moderate, medium, prismatic structure; hard, firm, slightly sticky and slightly plastic; noncalcareous; few very fine, common medium and few coarse roots; few fine and common medium pores; clear smooth boundary.

IIA&C (32-48 inches) Wet; stratified very dark grayish brown (10YR3/2) and black (10YR2/1) sandy clay loam; massive; sticky and plastic; noncalcareous; few medium roots; no pores; clear, wavy boundary.

IIIC (48+ inches) Saturated; brown (10YR4/3) extremely gravelly loamy sand; single graine; loose, nonsticky and nonplastic; noncalcareous; no roots; no pores.

Community Type: Artemisia tridentata/Poa pratensis (ARTR/POPR)
Area: North Fork Cottonwood Creek
Classification: Loamy-skeletal, mixed, frigid, Aquic Haploboroll
Parent Material: Alluvium
Physiography: Toe of alluvial fan; cut bank;
Slope: 2 to 5 percent perpendicular to streamflow;
Ground Water: 51 inches on 6/24/86;
Description: (Site CR3)

C1 (0-4 inches) Dry; light brownish gray (10YR6/2) very fine sandy loam; dark grayish brown (10YR4/2) moist; weak, medium granular structure; soft, very friable, nonsticky and nonplastic; noncalcareous; common fine and few medium roots; no pores; abrupt smooth boundary.

A1 (4-18 inches) Dry; dark gray (10YR4/1) gravelly sandy loam; very dark gray (10YR3/1) moist; moderate, medium granular structure; slightly hard, very friable, nonsticky and nonplastic; noncalcareous; common fine, few medium and few coarse roots; common fine pores, diffuse boundary.

AC (18-36 inches) Moist; dark grayish brown (10YR4/2) gravelly sandy loam; weak, medium, subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; noncalcareous; few fine roots; common fine pores; diffuse boundary.

C2 (36-50+ inches) Saturated; brown (10YR5/3) extremely gravelly loamy sand; single grained; loose, nonsticky and nonplastic; noncalcareous; few fine roots; no pores.

Community Type: Amelanchier sp.-upland (AMEL-UPLAND)
Area: Gance Creek;
Classification: Loamy, mixed, frigid, Pachic Argiboroll
Parent Material: Colluvium/alluvium;
Physiography: Toe of residual slope; cut streambank;
Slope: 25 to 30 percent; perpendicular to streamflow;
Ground Water: ca. 80 inches on 9/22/85;
Description: (site GL2)

A (0-16 inches) Dry; grayish brown (10YR5/2) gravelly sandy loam; very dark grayish brown (10YR3/2) moist; weak, very-fine, granular to weak, fine, subangular blocky structure; soft, loose, nonsticky and nonplastic; noncalcareous; few very-fine, fine, and medium roots; few fine and medium pores; gradual, wavy boundary.

Bt (16-50 inches) Dry; light brownish gray (10YR6/2) gravelly loam; brown (10YR4/3) moist; few, medium, prominent mottles; moderate, very-fine, angular, blocky parting to very-fine, platy structure; slightly hard, friable, slightly sticky and nonplastic; few fine and medium roots; few medium pores; clear, smooth boundary.

IICg (50-74 inches) Moist; gray (5Y5/1) very-fine sandy clay loam; moderate, medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; noncalcareous; few very fine and fine roots; few fine and medium pores; may function as an aquilude.

IIIC (74+ inches) Saturated; extremely gravelly valley-fill.

Community Type: Artemisia tridentata-upland (ARTR-UPLAND)
Area: Tabor Creek;
Classification: Loamy-skeletal, mixed, frigid, Pachic Haploboroll
Parent Material: Alluvium;
Physiography: Toe of steep alluvial fan; cut streambank;
Slope: 3 to 8 percent perpendicular to streamflow;
Ground Water: ca 9 feet on 7/1/86;
Description: (Site TL7)

A1 (0-12 inches) Dry; dark grayish brown (10YR4/2) gravelly sandy loam; very dark grayish brown (10YR3/2) moist; weak, medium granular structure; soft, loose, nonsticky and nonplastic; noncalcareous; few very-fine, fine, medium and coarse roots; clear smooth boundary.

C1 (12-22 inches) Dry; pale brown (10YR6/2) very gravelly loamy sand; brown (10YR4/3) moist; weak, fine, subangular blocky structure; soft, loose, nonsticky and nonplastic; noncalcareous; few fine and medium roots; few fine and medium pores; clear, smooth boundary.

A2b (22-48 inches) Dry; dark grayish brown (10YR4/2) gravelly loam; very dark grayish brown (10YR3/2) moist; weak, fine granular structure; slightly hard; very friable, slightly sticky and slightly plastic; few fine and medium roots; few fine and medium pores; diffuse, wavy boundary.

C2 (48-60 inches) Moist; pale brown (10YR6/3) sandy loam; brown (10YR4/3) moist; moderate, fine, subangular-blocky structure; friable, slightly sticky and nonplastic; no roots; few fine pores; clear, wavy boundary.

C3 (60+ inches) Moist to saturated; Brown (10YR4/3) extremely gravelly loamy sand; valley-fill;

Community Type: Carex nebrascensis (CANE)
Area: Tabor Creek; 50 feet north of stream at transect R1;
Classification: Loamy, mixed, frigid, Fluvaquentic Haplaquoll
Parent Material: Fluvium; fine-sediments;
Physiography: Floodplain within channel;
Slope: Not applicable;
Ground Water: At surface;
Description: (Site TR2)

A (0-12 inches) Saturated; very dark grayish brown (10YR3/2) loam; goopy; nonsticky and nonplastic; noncalcareous; common very fine and many fine roots; no pores; clear smooth boundary.

C1 (12-20 inches) Saturated; dark gray (10TR4/1) very gravelly loamy sand; single-grained; loose, nonsticky and nonplastic; noncalcareous; few very fine and fine roots; no roots; diffuse boundary.

C2 (20+ inches) Saturated; extremely gravelly valley-fill.

Community Type: Carex nebrascensis (CANE)
Area: Tabor Creek;
Classification: Fine-loamy, mixed, frigid, Cumulic Haplaquoll
Parent Material: Alluvium
Physiography: Seep; toe of alluvial fan;
Slope: 2 to 3 percent perpendicular to streamflow;
Ground Water: 0 inches on 6/26/86;
Description: (Site TL6)

A1 (0-16 inches) Saturated; black (10YR2/1) loam; goopy, nonsticky and nonplastic; noncalcareous; many very fine, fine and few medium roots; no pores; clear smooth boundary.

CA (16-30 inches) Saturated; very dark gray (10YR3/1) gravelly loamy sand; single-grained; loose, nonsticky and nonplastic; noncalcareous; few very fine and fine roots; no pores; clear smooth boundary.

C1 (30+ inches) Saturated; very dark greenish gray (5G3/1) gravelly sandy clay loam; massive; sticky and plastic; noncalcareous; no roots; no pores.

Community Type: Carex vesicaria (CAVE) Minor CT
Area: Gance Creek; east flank of valley-bottom;
Classification: Euic, frigid, Typic Medisaprist
Parent Material: Organic
Physiography: Spring discharge area at toe of slope;
Slope: Not applicable;
Ground Water: saturated to surface (capillary-rise);
Description: (GR4)

O2 (0-30 inches) Saturated; hemic; many very fine and fine roots.

C1 (30+ inches) Saturated; dark greenish gray (5G4/1) very gravelly loamy-sand; single-grained; loose, nonsticky and nonplastic; noncalcareous.

Community Type: Carex vesicaria (CAVE) Minor CT
Area: Deer Creek; 2 feet from stream at transect R39;
Classification: Fine-loamy, mixed, frigid, Typic Fluvaquent
Parent Material: Fine-grained fluvium from rhyolite;
Physiography: streambank; 0.5 feet above stream level;
Slope: Not applicable;
Ground Water: saturated to surface (capillary-rise);
Description: (Site DR1)

Alg (0-19 inches) Saturated; olive gray (5Y4/1) silt loam; goopy; sticky and slightly plastic; many fine and common medium roots; no pores; clear, smooth boundary.

C (19+ inches) Saturated; brown (10YR4/4) very gravelly silt loam; weak, very-fine, subangular-blocky structure; slightly sticky and nonplastic; noncalcareous; few fine roots; no pores.

Community Type: Juncus balticus (JUBA)

Area: Tabor Creek;

Classification: Sandy-skeletal, mixed, frigid, Aeric Fluvaquent

Parent Material: Fluvium

Physiography: active floodplain; 0.5 to 1.5 feet above stream

Slope: Not applicable;

Ground Water: 14 inches on 6/26/86;

Description: (Site TL1)

A1 (0-7 inches) Moist; dark grayish brown (10YR4/2) gravelly sandy loam; weak, very-fine granular structure; loose, nonsticky and nonplastic; noncalcareous; many fine and common medium roots; no pores; clear smooth boundary.

C1 (7-14 inches) Wet; brown (10YR4/3) extremely gravelly loamy sand; single-grained; loose, nonsticky and nonplastic; noncalcareous; common fine roots; no pores; clear smooth boundary.

C2 (14+ inches) Saturated; brown (10YR5/3) extremely gravelly sand; single-grained; loose, nonsticky and nonplastic; few fine roots; no pores.

Community Type: Juncus balticus (JUBA)

Area: Big Creek, northeastern Utah;

Classification: Coarse-loamy, mixed, mesic, Aquic Argiboroll;

Parent Material: Fluvium;

Physiography: Floodplain; 2 to 3 feet above stream level;

Slope: 2 to 3 percent parallel with stream direction;

Ground Water: 36 inches;

Description:

A1 (0-16 inches) Dry; grayish brown (10YR5/2) very fine sandy loam; very dark grayish brown (10YR3/2) moist; moderate fine granular structure; soft, friable nonsticky and nonplastic; slightly calcareous; common very fine and few fine roots; no pores; gradual smooth boundary.

Bt (16-28 inches) Moist; grayish brown (10YR5/2) silt loam; very dark grayish brown (10YR3/2) moist; few, medium prominent (7.5YR5/6) mottles; common, thick clay skins on ped faces; strong, fine, subangular blocky structure; hard, firm, slightly sticky and plastic; calcareous; few fine and medium roots; no pores; gradual boundary.

Clg (28-36 inches) Wet; gray (5Y5/1) silt loam; few, medium, prominent (7.5YR5/6) mottles; massive; slightly sticky and slightly plastic; calcareous; few fine and medium roots; no pores; clear smooth boundary. C2g (36-47 inches) Saturated; gray (5Y5/1) very fine sandy loam; common, large, prominent (7.5YR5/6) mottles; massive; nonsticky and nonplastic; calcareous; few fine and medium roots; few fine pores; clear smooth boundary. 2C3 (47+ inches) Saturated valley fill; extremely gravelly loamy sand; single grain; loose, nonsticky and nonplastic; no roots; no pores.

Community Type: Eleocharis pauciflora (ELPA)

Area: Gance Creek;

Classification: Fine-loamy, mixed, frigid, Histic Fluvaquent

Parent Material: Spring outwash over fluvium

Physiography: spring discharge channel;

Slope: 1 to 3 percent

Ground Water: at surface on 6/18/86

Description: (Site GR1)

O2 (0 to 6 inches) Saturated; Dark greenish gray (5G4/1) sapric organic material; noncalcareous; many very fine roots; clear, smooth boundary.

C1 (6 to 11 inches) Saturated; light greenish gray (5BG4/1) sandy clay loam; massive; slightly sticky and slightly plastic; noncalcareous; many very fine roots; no pores; clear smooth boundary.

C2 (11+ inches) Saturated; light greenish gray (5BG4/1) very gravelly sandy clay loam; massive; slightly sticky and slightly plastic; noncalcareous; common very fine roots; no pores.

Community Type: Poa pratensis (POPR)

Area: Gance Creek; 20 feet west of stream at transect R28;

Classification: Fine-loamy, mixed, frigid, Aquic Argiboroll;

Parent Material: Fluvium;

Physiography: Floodplain; 2 to 3 feet above stream level;

Slope: 2 to 3 percent parallel with stream direction;

Ground Water: 30 inches on 6/18/86;

Description:

A (0-9 inches) Moist; very dark grayish brown (10YR3/2) loam; moderate, medium granular structure; slightly hard, friable, nonsticky and nonplastic; noncalcareous; common very fine and few medium roots; few fine pores; gradual, smooth boundary.

Bt (9-20 inches) Wet; very dark grayish brown (10YR3/2) sandy clay loam; common, medium, prominent mottles; moderate clay- skins on ped-faces and pores; moderate, fine, subangular- blocky structure; firm, sticky and plastic; few very fine, fine and medium roots; gradual, smooth boundary.

C (20-30 inches) Saturated; dark-greenish gray (5G4/1) coarse- sand; common, medium, prominent mottles; single-grained; loose, nonsticky and nonplastic; noncalcareous; no roots; no pores.

Community Type: Poa pratensis (POPR)
Area: Tabor Creek; southern flank of valley-bottom;
Classification: Fine-loamy, mixed, frigid, Aquic Argiboroll;
Parent Material: Alluvium;
Physiography: Seep area at toe of alluvial fan;
Slope: 3 percent parallel with stream direction;
Ground Water: 48 inches on 6/26/86;
Description:

A1 (0-6 inches) Dry; dark gray (10YR4/1) silt loam; very dark grayish brown (10YR3/1) moist; strong, medium, granular structure; slightly hard, friable, sticky and plastic; noncalcareous; common very fine, fine and few medium roots; no pores; clear, smooth boundary.

Bt (6-22 inches) Dry; very dark grayish brown (10YR3/2) fine- loam; clay-skins on ped faces; strong, fine, subangular- blocky structure; hard, friable, sticky and plastic; noncalcareous; few very fine, few fine and common medium roots; no pores; diffuse boundary.

C1g (22-36 inches) Wet; greenish gray (5G5/1) gravelly sandy loam; massive; slightly sticky and slightly plastic; noncalcareous; few fine roots; no pores; abrupt, smooth boundary.

C2g (36-60 inches) Saturated; greenish gray (5G5/1) clay loam; common, large, prominent mottles; massive; sticky and plastic; many very-fine (dead) roots; common very fine and fine vescicular pores; unknown boundary (augered).

C3g (60+ inches) Saturated; greenish gray (5G5/1) extremely gravelly valley-fill.

Community Type: Scirpus microptera (SCMI) Minor CT
Area: Gance Creek near transect R6;
Classification: Loamy-skeletal, mixed, frigid, Thaptohistic Fluvaquent
Parent Material: Coarse-grained fluvium and in-situ organics;
Physiography: streambar influenced by seep;
Slope: Not applicable;
Ground Water: Saturated to surface;
Description:

C1 (0-1 inches) Wet; dark grayish brown (10YR4/2) sandy loam; weak, fine-granular structure; soft, loose, nonsticky and nonplastic; noncalcareous; many very fine and few fine roots; no pores; clear, smooth boundary.

Ag (1-12 inches) Saturated; dark gray (5GY3/1) loam; very-high, fibric organic matter; slightly sticky and slightly plastic; noncalcareous; many very fine and common fine roots; no pores; clear, wavy boundary.

C2g (12+ inches) Saturated; bluish gray (5B5/1) very gravelly and cobbly clay loam; massive; sticky and plastic; noncalcareous; no roots; no pores.

Community Type: Mimulus guttatus (MIGU) Minor CT
Area: Gance Creek; near transect R128;
Classification: Fine-loamy, mixed, frigid, Histic Fluvaquent
Parent Material: Fine sediments from spring area to east;
Physiography: Spring channel;
Slope: 1 to 3 percent normal to streamflow;
Ground Water: saturated to surface;
Description:

C1 (0-6 inches) Saturated; dark greenish gray (5G4/1) silt loam; very- high, sapric organic matter; goopy; nonsticky and nonplastic; noncalcareous; many fine roots; no pores; clear smooth boundary; sediments oozing down channel.

C2 (6-11 inches) Saturated; dark greenish gray (5BG4/1) sandy clay loam; massive; slightly sticky and slightly plastic; noncalcareous; many very fine roots; no pores; clear, smooth boundary.

C3 (11+ inches) Saturated; dark greenish gray (5BG4/1) very gravelly, sandy clay loam; massive; slightly sticky and slightly plastic; noncalcareous; few very fine roots; no pores.

Community Type: Herbaceous sand bar (HSB)

Sand bar (SB)

Area: Tabor Creek; near transect R75;

Classification: Sandy, mixed, frigid, Aeris Fluvaquent;

Parent Material: Coarse-grained fluvium/valley-fill;

Physiography: Streambar;

Slope: Not applicable;

Ground Water: 5 inches on 7/1/86;

Description:

A1 (0-4 inches) Moist; dark grayish brown (10YR4/2) very-fine sandy loam; single-grained; loose, nonsticky and nonplastic; noncalcareous; few fine, very fine and medium roots; no pores; gradual, smooth boundary.

C1 (4-10 inches) Wet; brown (10YR4/3) loamy sand; single grained; loose, nonsticky and nonplastic; noncalcareous; few fine and medium roots; no pores; clear smooth boundary.

C2 (10+ inches) Saturated; extremely gravelly loamy sand (valley- fill).

Community Type: Herbaceous gravel bar (HGB)

Gravel bar (GB)

Area: North Fork Cottonwood Creek;

Classification: Fragmental, mixed, frigid, Aeris Fluvaquent;

Parent Material: Valley-fill;

Physiography: Streambar;

Slope: Not applicable;

Ground Water: 6 inches on 6/24/86;

Description: (Site R4)

AC (0-2 inches) Wet; very dark grayish brown (10YR3/2) extremely gravelly sandy loam; single grained; loose, nonsticky and nonplastic; noncalcareous; common very-fine and fine roots; no pores; gradual, smooth boundary.

C (2+ inches) Saturated; extremely gravelly loamy sand (valley-fill).

APPENDIX E - PLANT FAMILIES AND COMMON NAMES

TREES

SALICACEAE

Populus tremuloides	quaking aspen
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SHRUBS

CAPRIFOLIACEAE

Sambucus caerulea	blue elderberry
Symphoricarpos oreophilus	mountain snowberry

COMPOSITAE

Artemisia tridentata	big sagebrush
Chrysothamnus nauseosus	rubber rabbitbrush
Chrysothamnus viscidiflorus	Douglas rabbitbrush

CORNACEAE

Cornus sericea	redosier dogwood
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BETULACEAE

Alnus incana	thinleaf alder
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ROSACEAE

Amelanchier spp.	serviceberry
Prunus virginiana	common chokecherry
Purshia tridentata	antelope bitterbrush
Rosa woodsii	woods rose

SALICACEAE

Salix boothii	Booth willow
Salix exigua	coyote willow
Salix geyeriana	Geyers willow
Salix lasiandra	Pacific willow
Salix lutea	yellow willow
Salix spp.	willow

SAXIFRAGACEAE

Ribes aureum	golden currant
Ribes cereum	wax currant
Ribes spp.	currant

GRAMINOIDS

CYPERACEAE

Carex aurea	golden sedge
Carex douglasii	Douglas sedge
Carex lanuginosa	wooly sedge
Carex microptera	smallwing sedge
Carex nebrascensis	Nebraska sedge
Carex praegracilis	fieldclustered sedge
Carex spp.	sedge
Carex vesicaria	blister sedge
Eleocharis pauciflora	fewflowered spikerush
Eleocharis rostellata	beaked spikerush
Scirpus microcarpus	panicled bulrush

EQUISETACEAE

Equisetum arvense	field horsetail
Equisetum spp.	horsetail

GRAMINEAE

Agropyron spicatum	bluebunch wheatgrass
Agropyron spp.	wheatgrass
Agropyron trachycaulum	slender wheatgrass
Agrostis scabra	ticklegrass
Agrostis stolonifera	carpet bentgrass
Alopecurus aequalis	shortawn foxtail
Bromus carinatus	mountain brome
~~Bromus tectorum~~	cheatgrass
Calamagrostis canadensis	bluejoint wheatgrass
Catabrosa aquatica	brookgrass
Deschampsia caespitosa	tufted hairgrass
Deschampsia danthonioides	annual hairgrass
Elymus cinereus	basin wildrye
Elymus triticoides	creeping wildrye
Festuca idahoensis	Idaho fescue
Glyceria spp.	mannagrass
Hordeum brachyantherum	meadow barley
Melica bulbosa	oniongrass
Muhlenbergia richardsonis	mat muhly
Phleum pratense	timothy
Poa annua	annual bentgrass
Poa palustris	fowl bluegrass
Poa pratensis	Kentucky bluegrass
Poa secunda	Sandberg bluegrass
Poa spp.	bluegrass
Sitanion hystrix	bottlebrush squirreltail
Stipa comata	needle-and-thread
Stipa spp.	needlegrass

JUNCACEAE

Juncus balticus	baltic rush
Juncus bufonius	toad rush
Juncus ensifolius	swordleaf rush
Juncus spp.	oniongrass

TYPHACEAE

Typha latifolia	common cattail
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FORBS

BORAGINACEAE

Cryptantha spp.
Hackelia spp.
Lappula occidentalis
Lithospermum ruderales

cryptantha
stickseed
stickseed
stoneseed

CARYOPHYLLACEAE

Cerastium fotanum
Descuriana spp.
Sagina saginoides
Stellaria spp.

chickweed
tansymustard
Artic pearlwort
starwort

COMPOSITAE

Achillea millefolium
Agoseris glauca
Arnica sp.
Arnica cordifolia
Artemisia ludoviciana
Aster occidentalis
Aster spp.
Balsamorhiza sagittata
Chaenactis douglasii
Cirsium arvense
Cirsium scariosum
Cirsium vulgare
Crepis acuminata
Erigeron spp.
Iva axillaris
Lactuca serriola
Senecio integerrimus
Senecio serra
Senecio spp.
Senecio streptanthifolius
Sonchus oleraceus
Taraxacum officinale
Tragopogon dubius
Wyethia amplexicaulis

common yarrow
pale agoseris
arnica
heartleaf arnica
Louisiana sagewort
western aster
aster
arrowleaf balsamroot
Douglas dustymaiden
Canadian thistle
thistle
bull thistle
tapertip hawksbeard
daisy
povertyweed
prickly lettuce
lambstongue groundsel
butterweed
groundsel
manyface groundsel
common thistle
common dandelion
yellow salsify
mulesear dock

CRUCIFERAE

Allysum alyssioides
Arabis holboellii
Arabis spp.
Barbarea spp.
Calochortus nuttallii
Camelina microcarpa
Capsella bursa- pastoris
Lepidium virginicum
Microsteris gracilis
Nasturtium officinale
Sisymbrium altissimum
Thlaspi arvense
Thlaspi montanum

pale alyssum
holboel rockcress
rockcress
wintercress
sego lily
littleseed falseflax
shepherds purse
Virginia pepperweed
false phlox
watercress
tumble mustard
field pennycress
blue pennycress

FUMARIACEAE

Corydalis aurea

golden corydalis

FORBS (CONTINUED)

GERANIACEAE

Erodium cicutarium
Geranium spp.

storksbill
 geranium

GUTTIFERAE

Hypericum formosum

St. Johnswort

HYDROPHYLLACEAE

Hydrophyllum capitatum
Phacelia hastata

ballhead waterleaf
 spearshaped phacelia

IRIDACEAE

Iris missouriensis
Sisyrinchium spp.

Rocky Mountain iris
 blue-eyed grass

LABIATAE

Agastache urticifolia
Marrubium vulgare
Mentha arvensis

horsemint
 horehound
 field mint

LEGUMINOSAE

Astragalus spp.
Astragalus agrestis
Lupinus spp.
Medicago lupulina
Trifolium cyathiferum
Trifolium wormskjoeldfi

locoweed
 purple milkvetch
 lupine
 black medic
 cup clover
 Sierra clover

LILIACEAE

Allium acuminatum
Allium spp.
Smilacina stellata
Zigadenus paniculatus

tapertip onion
 onion
 stary false solomon-seal
 foothill deathcamas

UMBELLIFERAE

Osmorhiza occidentalis

western sweetcicely

LOASACEAE

Mentzelia spp.

blazingstar

MALVACEAE

Sidalcea oregana

Oregon checkermallow

ONAGRACEAE

Epilobium ciliatum
Gayophytum spp.
Oenothera hookeri

hairy willowweed
 groundsmoke
 Hooker evening primros

ORCHIDACEAE

Habenaria dilatata

white bogorchid

PLANTAGINACEAE

Plantago major

broadleaf plantain

POLEMONACEAE

Collomia linearis
Gilia aggregata
Mertensia ciliata
Mertensia oblongifolia

slenderleaf collomia
 skyrocket gilia
 mountain bluebells
 oblongleaf bluebells

FORBS (CONTINUED)

POLYGONACEAE

Polygonum spp.
Rumex acetosella
Rumex crispus
Rumex salicifolius

knotweed
sheep sorrel
curlydock
willow dock

PORTULACAEAE

Montia perfoliata

minerslettuce

RANUNCULACEAE

Aconitum columbianum
Aquilegia formosa
Ranunculus cymbalaria
Ranunculus testiculatus

Columbia monkshood
stika columbine
alkali buttercup
bur buttercup

ROSACEAE

Geum macrophyllum
Potentilla biennis
Potentilla gracilis
Potentilla spp.

largeleaf avens
biennial cinquefoil
northwest cinquefoil
cinquefoil

RUBIACEAE

Galium aparine
Galium biflorum

catchweed bedstraw
northern bedstraw

SANTALACEAE

Comandra umbellata

bastard toadflax

SAXIFRAGACEAE

Lithophragma parviflora

smallflower woodlandstar

SCROPHULARIACEAE

Collinsia parviflora
Mimulus guttatus
Mimulus lewisii
Mimulus moschatus
Penstemon humilus
Penstemon speciosus
Scrophularia lanceolata
Verbascum thapsus
Veronica americana
Veronica serpyllifolia

littleflower collinsia
common monkeyflower
Lewis monkeyflower
muskplant monkeyflower
low penstemon
royal penstemon
lanceleaf figwort
flannel mullein
American speedwell
thymeleaf speedwell

UMBELLIFERAE

Angelica kingii
Lomatium dissectum

king angelica
fernleaf lomatium

URTICACEAE

Urtica dioica

nettle

VIOLACEAE

Viola adunca
Viola spp.

Hook violet
violet

DATA FILE DESCRIPTIONS
NEVADA STUDY SITES
(REVISED 2/18/88)

SITES

STUDY SITES

TABOR CREEK (TC)
GANCE CREEK (GC)
NORTH FORK COTTONWOOD (NFC)
DEER CREEK (DC)

DATE

MONTH, DAY, YEAR THAT FIELD DATA WAS COLLECTED.

TRANSECT

TRANSECT NUMBER (INCREASING IN UPSTREAM DIRECTION); TREATMENTS
CORRESPONDING WITH A SPAN OF TRANSECTS, AS LISTED IN FOLLOWING TABLE.

SITE	TRANSECTS	TREATMENT
TABOR	1 - 61	TREATMENT 1 (GRAZED)
	61 - 122	TREATMENT 2 (RESTED)
	123 - 183	TREATMENT 3 (GRAZED)
GANCE	1 - 61	TREATMENT 1 (GRAZED)
	62 - 122	TREATMENT 2 (RESTED)
	123 - 183	TREATMENT 3 (GRAZED)
NORTH FORK COTTONWOOD	1 - 20	TREATMENT 1 (GRAZED)
	21 - 60	TREATMENT 2 (RESTED)
	61 - 80	TREATMENT 3 (GRAZED)
DEER	1 - 20	TREATMENT 1 (GRAZED)
	21 - 60	TREATMENT 2 (RESTED)
	61 - 80	TREATMENT 3 (GRAZED)

SIDE

LEFT - LEFT SIDE OF STREAM (FACING DOWNSTREAM)

RIGHT - RIGHT SIDE OF STREAM (FACING DOWNSTREAM)

POSITIONS

CHANNEL (C) - THAT PORTION OF THE FLOODPLAIN WHICH IS FLOODED BY MODERATE
STREAMFLOW; CHARACTERIZED BY SEDIMENTS SIMILAR TO THAT OF THE
STREAM BOTTOM.

BANK(B) - THAT WHICH ACTS TO RESTRICT THE LATERAL EXTENT OF MODERATE
STREAMFLOW; CHARACTERIZED BY SEDIMENTS DISSIMILAR TO THAT OF THE STREAM
BOTTOM.

WIDTHS

THE LINEAR DISTANCE (FEET) ALONG TRANSECT LINES IN WHICH A COMMUNITY OR SOIL
TYPE OCCURS.

COMMUNITY TYPES
(REVISED 2/18/88 - SEE NOTE!)

SUBSTRATE TYPES (100 SERIES)

- 100 SILT BAR (SIB)
- 105 HERBACEOUS SILT BAR (HSIB)
- 110 SAND BAR (SB)
- 115 HERBACEOUS SAND BAR (HSB)
- 120 GRAVEL BAR (GB)
- 125 HERBACEOUS GRAVEL BAR (HGB)
- 130 COBBLE BAR (CB)
- 135 HERBACEOUS COBBLE BAR (HCB)
- 140 BOULDER OR BEDROCK (ROCK)
- 150 ERODED BANK (EB)
- 160 SLUMP

HERBACEOUS COMMUNITIES (200 SERIES)

SEMIPERMANENTLY FLOODED TYPES (210-220)

- 211 CANE
- 212 ELEOCHARIS PAUCIFLORA
- 213 CARO
- 214 CAVE

SEASONALLY FLOODED TYPES (220-230)

- 221 JUNCUS BALTICUS
- 222 POA PRATENSIS
- 223 MIXED HERBACEOUS

SATURATED (240-250)

- 241 MIMULUS GUTTATUS
- 242 SCIRPUS MICROPTERA

SHRUB TYPES (300 SERIES)

INTERMITTENTLY FLOODED

- 310 SALIX/DOWN WOODY MATERIAL
- 311 SALIX/SAND BAR
- 312 SALIX/GRAVEL BAR
- 313 SALIX/COBBLE BAR

SEMIPERMANENTLY FLOODED

- 320 SALIX/CAREX

SEASONALLY FLOODED

- 330 SALIX/MESIC HERBACEOUS
- 331 SALIX EXIGUA/MIXED HERBACEOUS

SUBIRRIGATED

- 340 ARTEMISIA TRIDENTATA/POA PRATENSIS (ARTR/POPR)

UPLAND

- 350 ARTEMISIA TRIDENTATA-UPLAND (ARTR-UP)
- 360 AMELANCHIER SPP.-UPLAND (AMEL-UP)

FORESTED AND UPLAND TYPES (500 SERIES)

SEASONALLY FLOODED

- 540 POPULUS TREMULOIDES/MESIC HERBACEOUS

UPLAND

- 550 POPULUS TREMULOIDES/ARTEMESIA TRIDENTATA

MISCELLANEOUS LAND TYPES

191 SPRING INLET
192 DOWN WOODY MATERIAL (DWM)
195 MINE TAILINGS
197 WATER
199 ROAD

!!NOTE - DATA CODES TRANSFORMED FOR ALL SITES ON 2/18/88 ARE:

201 --> 105
202 --> 115
203 --> 125
204 --> 135
223 --> 222
224 --> 242
510 --> 340
520 --> 350
530 --> 360

UTAH AND NEVADA
SOIL LEGEND

SOIL CODE	CT CODE	SITE CODE*	SOIL TYPE**
1001	SIB	C-ND	loamy, mixed, frigid, Typic Fluvaquent
1101	SB	G3	sandy, mixed, frigid, Aeric Fluvaquent
1101	SB	CR6	sandy, mixed, frigid, Aeric Fluvaquent
1101	SB	TR3	sandy, mixed, frigid, Aeric Fluvaquent
1201	GB	GR7	fragmental, mixed, frigid, Aeric Fluvaquent
1201	GB	CR4	fragmental, mixed, frigid, Aeric Fluvaquent
1202	GB	ND	HIGH GRAVEL BAR (2 FT ABOVE STREAM)
1203	GB	D	loamy-skeletal, mixed, frigid, Typic Fluvaquent
1301	CB	ND	fragmental, mixed, frigid, Aeric Fluvaquent
1501	EB	ND	BANK FORMING SOIL TYPE
1502	EB	ND	SLUMPED OR CLEAVED BANK MATERIAL
1921	DWM	D-ND	DOWN WOODY MATERIAL; LOGS
1971	WATER	ND	WATER
1981	DIST	D	SEVERELY DISTURBED
1991	ROAD	ND	ROAD
1151	HSB	ND	sandy, mixed, frigid, Aeric Fluvaquent
1251	HGB	TR4	fragmental, mixed, frigid, Aeric Fluvaquent
2111	CANE	UR2	loamy, mixed, frigid, Fluvaquentic Haplaquoll
2111	CANE	TL6	loamy, mixed, frigid, Fluvaquentic Haplaquoll
2113	CANE	TL6	loamy, mixed, frigid, Cumulic Haplaquoll
2121	ELPA	GR3	euic, frigid, typic, Medisaprist
2141	CAVE	GR4	euic, frigid, Typic Medisaprist
2142	CAVE	D	fine-loamy, mixed, frigid, Typic Fluvaquent
2211	JUBA	UR1	loamy, mixed (calc), frigid, Aquic Argiboroll
2211	JUBA	LR4	loamy, mixed (calc), frigid, Aquic Argiboroll
2212	JUBA	TL1	sandy-skeletal, mixed, frigid, Aeric Fluvaquent
2213	JUBA	D	fine-loamy, mixed, frigid, Aquic Argixeroll
2221	POPR	TL3	loamy, mixed, frigid, Aquic Argiboroll
2221	POPR	GL3	loamy, mixed, frigid, Aquic Argiboroll
2222	POPR	TL5	loamy, mixed, frigid, Fluvaquentic Haploboroll
2223	POPR	GR5	loamy-skeletal, mixed, frigid, Aquic Argiboroll
2224	POPR	D	fine-loamy, mixed, frigid, Aquic Argiboroll
2231	MH	L	sandy-skeletal/loamy, mixed (calc), frigid, Aquic Argiboroll
2232	MH	?	loamy-skeletal, mixed, frigid, Aquic Ustifluvent
2421	SCMI	GR6	loamy-skeletal, mixed, frigid, Thaptohistic Fluvaquent
2411	MIGU	GR1	fine-loamy, mixed, frigid, Histic Fluvaquent
3101	SALIX/DWM	U-ND	loamy-skeletal, mixed (calc), frigid, Aeric Fluvaquent
3103	SALIX/DWM	T-ND	loamy, mixed, frigid, Fluvaquentic Haploboroll
3104	SALIX/DWM	G-ND	loamy-skeletal, mixed, frigid, Aquic Ustifluvent
3105	SALIX/DWM	C-ND	sandy skeletal, mixed, Aquic Ustifluvent
3111	SALIX/SB	TL2	sandy, mixed, frigid, Aeric Fluvaquent
3111	SALIX/SB	T-ND	sandy, mixed, frigid, Aeric Fluvaquent
3121	SALIX/GB	ND	fragmental, mixed, frigid, Aeric Fluvaquent
3201	SALIX/CANE	GR5	loamy-skeletal, mixed, frigid, Mollic Fluvaquent

SOIL LEGEND (CONTINUED)

SOIL CODE	CT CODE	SITE CODE	SOIL TYPE
3301	SALIX/MH	UR6	loamy-skeletal, mixed (calc), frigid, Aeris Fluvaquent
3302	SALIX/MH	TL4	loamy, mixed, frigid, Fluvaquentic Haplaquoll
3303	SALIX/MH	TL8	loamy, mixed, frigid, Fluvaquentic Haploboroll
3304	SALIX/MH	G2	loamy-skeletal, mixed, frigid, Aquic Ustifluvent
3304	SALIX/MH	GR2	loamy-skeletal, mixed, frigid, Aquic Ustifluvent
3306	SALIX/MH	D	loamy-skeletal, mixed, frigid, Aquic Ustifluvent
3305	SALIX/MH	CR5	sandy-skeletal, mixed, Aquic Ustifluvent
3305	SALIX/MH	CR2	sandy-skeletal, mixed, Aquic Ustifluvent
5101	ARIR/POPR	UR3	loamy, mixed (calc), frigid, Fluvaquentic Haploboroll
3501	ARIR-UP	UL11	loamy, mixed (calc), frigid, Calcixerollic Xerochrept
3402	ARIR/POPR	TL8	loamy, mixed, frigid, Fluvaquentic Haploboroll
3402	ARIR/POPR	TR5	loamy, mixed, frigid, Fluvaquentic Haploboroll
3403	ARIR/POPR	G4	loamy-skeletal, mixed, frigid, Aquic Haploboroll
3403	ARIR/POPR	CR3	loamy-skeletal, mixed, frigid, Aquic Haploboroll
3404	ARIR/POPR	D	loamy-skeletal, mixed, frigid, Aquic Argiboroll
3502	ARIR/UP	TL7	loamy-skeletal, mixed, frigid, Pachic Haploboroll
3503	ARIR/UP	CR2	loamy, mixed, frigid, Typic Haploboroll
3504	ARIR-UP	D	loamy-skeletal, mixed, frigid, Typic Argiboroll
3601	AMEL-UP	G	loamy, mixed, frigid, Pachic Argiboroll

U - UPPER BIG CREEK; L - LOWER BIG CREEK; G - GANCE CREEK; D - DEER CREEK;
C - NORTH FORK COTTONWOOD CREEK; T - TABOR CREEK; ND - NOT DESCRIBED;

** NOTE: SOIL CLASSIFICATIONS FOR NEVADA MAY BE REVISED BASED ON REVIEW OF SCS
SOIL SURVEY REPORTS (IN PRESS).